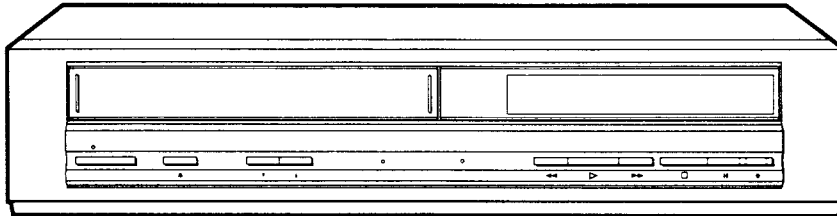




V04199

Service Manual

VIDEO CASSETTE RECORDER



MODEL

HS-M34(E)**HS-M34(P)**

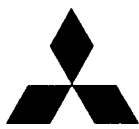
Only cassettes marked VHS can be used with this video cassette recorder.

SPECIFICATION

Tape Format	: VHS 1/2" high-density video cassette tape	Video Output	: 1.0 Vp-p, 75 ohm unbalanced RCA pin plug
Power Source	: 220V AC; 50Hz[EE] 110/120/220/240V AC;50Hz [P]	Audio Output	: -6 dBs, 1k ohm unbalanced RCA pin plug
Power Consumption	: Approx. 25W	Reception	
Television System	: 625 lines, 50 fields System CCIR B&G PAL and D/K SECAM[EE] System CCIR B&G PAL[P]	Frequency	
Video Recording System	: Azimuth helical scanning system	VHF	: 47~118, 118~300MHz[EE] 47~68, 174~230MHz[P]
Luminance	: Frequency modulation recording	UHF	: 470~862MHz
Colour Signal	: Low frequency conversion sub-carrier phase shift recording	Operating Temperature	: 5°C ~ 40°C
Linear Audio Track	: 1 track	RF Channel Output	: Channel 36
Tape Speed	: 23.39 mm/sec(SP mode) 11.70 mm/sec(LP mode)	Weight	: Approx. 5.5kg
Record/Playback Time	: 240 min. with E-240 cassette (SP mode) 480 min. with E-240 cassette (LP mode)	Dimensions	: 425(W) x 85(H) x 341.5(D)mm
Heads:Video	: 4 rotary heads	Timer	: 8 programmes for any channels in one month/every day/every week day 24 hour digital synchronized with crystal oscillator frequency.
Audio/Control Erase	: 1 stationary head 1 full track head	Channel Selection	: 99 position Up/Down + EXT
Video Input	: 0.75 to 1.5 Vp-p, 75 ohm unbalanced RCA pin plug	Deck	: F-Deck
Audio Input:Line	: -8 dBs, 50k ohm unbalanced RCA pin plug		

● Weight and dimensions shown are approximate.

● Design and specifications are subject to change without notice.


mitsubishi electric

CONTENTS

DISASSEMBLY	1	3. Interchangeability Adjustment of Mechanism	31
SERVICING THE PRINTED CIRCUIT BOARD	2	3-1 Adjustment of Back Tension and Tension Pole Position	31
MECHANICAL ADJUSTMENTS TOOLS	5	3-2 Check and Adjustment of FM Envelope	32
ELECTRICAL ADJUSTMENTS TOOLS	6	3-2-1 Guide Roller Adjustment	32
ELECTRICAL ADJUSTMENTS	7	3-2-2 Adjustment of Supply Guide Roller Height	32
Servo Circuit Adjustment	8	3-2-3 Adjustment of Takeup Guide Roller Height	32
Y/C Signal Circuit Adjustments	8	3-2-4 Coarse Phase Adjustment	33
Audio Circuit Adjustments	12	3-2-5 Check of FM Waveform Flatness	33
Timer Circuit Adjustment	13	3-2-6 Check 1 : Tape Running Condition on Guide Rollers	34
MECHANICAL ADJUSTMENT AND REPLACEMENT ..	14	3-2-7 Replacement of Tape Guides	34
1. Cleaning of Deck	14	3-2-8 Check 2 : Tape Running Condition on Guide Rollers	34
1-1 Video Head	14	3-3 Adjustment of Audio/Control Head	35
1-2 Tape Transport	14	3-3-1 Adjustment of A/C Head Slant	35
1-3 Reel Disk Drive System	14	3-3-2 Adjustment of A/C Head Azimuth and Height	35
2. Replacement of Major Parts	15	3-3-3 Replacement of Tape Guides	36
2-1 Cassette Housing	15	3-4 Phase Adjustment	36
2-2 Lock arm and Drive gear	15	3-5 Adjustment of Takeup Guide Arm Height	36
2-3 Drum Assembly	16	KEY TO ABBREVIATIONS	37
2-4 Upper Drum	17	PARTS LIST	38
2-5 Reel Belt	17	1. CABINET ASSEMBLY	38
2-6 Capstan Motor	17	2. PACKING PARTS	40
2-7 Loading Motor	18	3. ELECTRICAL PARTS	42
2-8 Pinch Roller	19	4. DECK ASSEMBLY	
2-9 Mode Switch	20	CIRCUIT DIAGRAMS	
2-10 Supply Reel Disk	20		
2-11 Takeup Reel Disk	23		
2-12 A/C Head	24		
2-13 Takeup Guide Arm	25		
2-14 Deck PCB	26		
2-15 Positioning and Installation Sequence of Parts Around Main Cam 1	27		
2-16 Supply and Takeup Guide Rollers	29		
2-17 Supply and Takeup Tape Guide Assemblies	29		

DISASSEMBLY

1. Removal of Top Cover

- Remove four screws (a~d), as shown in Fig.1.
- Gently expand the bottom edges of the top cover, then slide toward rear in the direction of the arrows.

2. Removal of Front Panel

- Remove the top cover.
- Unfasten six snaps (e~i), and remove the front panel in the direction of the arrows.

3. Installation of Front Panel

- Check that the door arm is in low position.
- While holding the cassette door open, mount the front panel to the VCR and fasten six snaps (e~i) using gently pressure to the front panel.

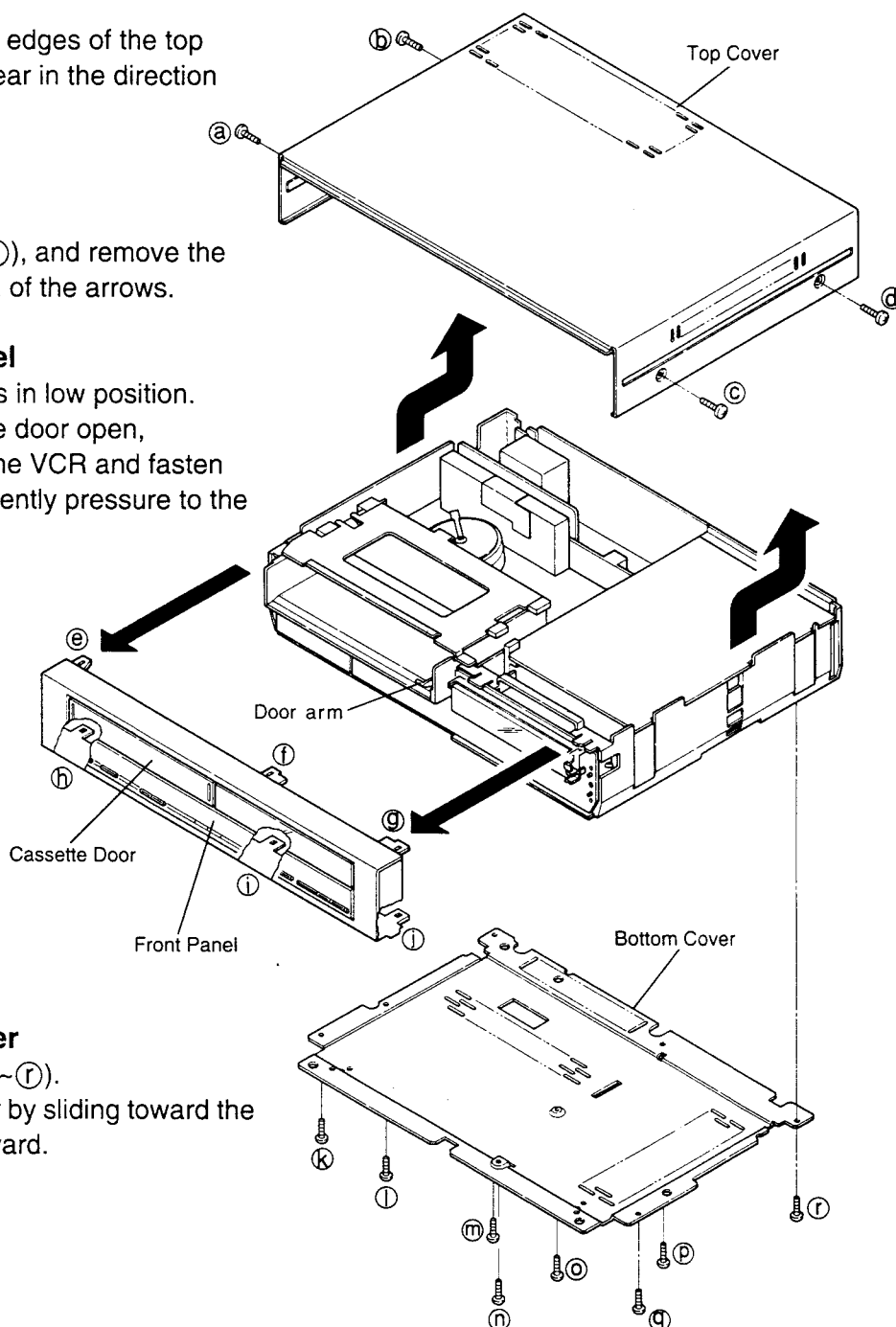


Fig.1

4. Removal of Bottom Cover

- Remove eight screws (k~r).
- Remove the bottom cover by sliding toward the rear side and pulling outward.

SERVICING THE PRINTED CIRCUIT BOARDS

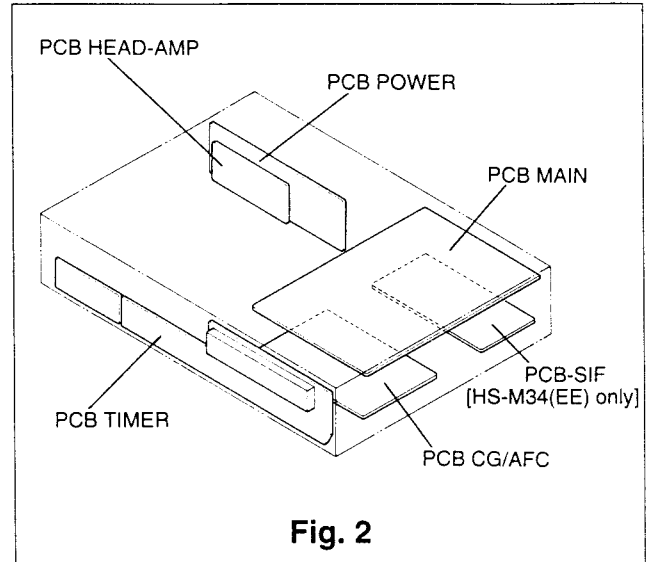
CAUTION: BEFORE ATTEMPTING TO REMOVE OR REPAIR ANY PCB, UNPLUG THE A.C. SOURCE.

Location of Printed Circuit Boards

(Refer to Fig. 2)

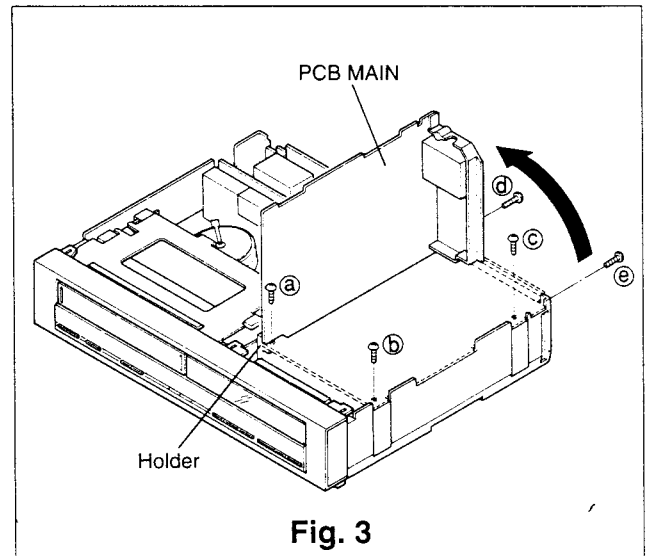
Note:

Use caution when disconnecting the flat cable connectors to avoid possible contact problems when reconnected.



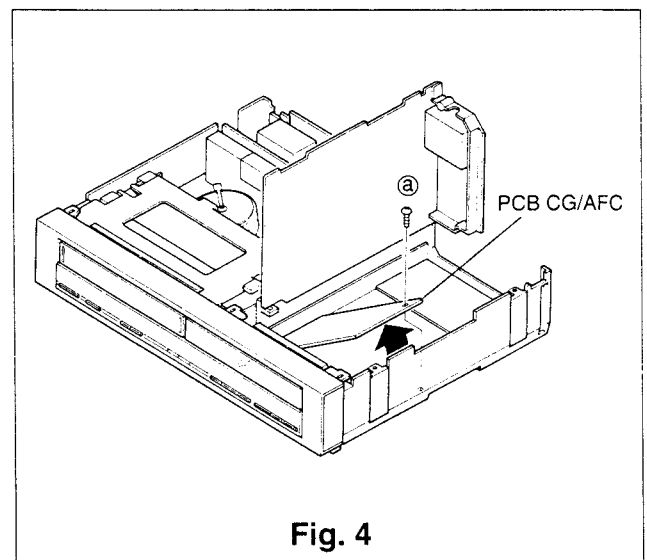
1. Removal of PCB MAIN

- A. Remove the top cover. (Page 1, Item 1)
- B. Remove five screws (a~e), as shown in Fig.3.
- C. Pivot the PCB MAIN in the direction of the arrow.
- D. Hang the edge of PCB MAIN to the holder on the frame.



2. Removal of PCB CG/AFC

- A. Remove the bottom cover (Page 1, Item 4) and the service of the PCB CG/AFC will be available.
- B. If it is necessary to remove the PCB CG/AFC comply with the following steps.
 - a. Remove the PCB MAIN.(Item 1)
 - b. Remove screw (a) retaining the PCB CG/AFC, as shown in Fig. 4.



3. Removal of PCB SIF [HS-M34(EE) only]

- A. Remove the bottom cover (Page 1, Item 4) and the service of the PCB SIF will be available.
- B. If it is necessary to remove the PCB SIF comply with the following steps.
 - a. Remove the PCB MAIN.(Item 1)
 - b. Remove screw ① retaining the PCB SIF, as shown in Fig. 5.

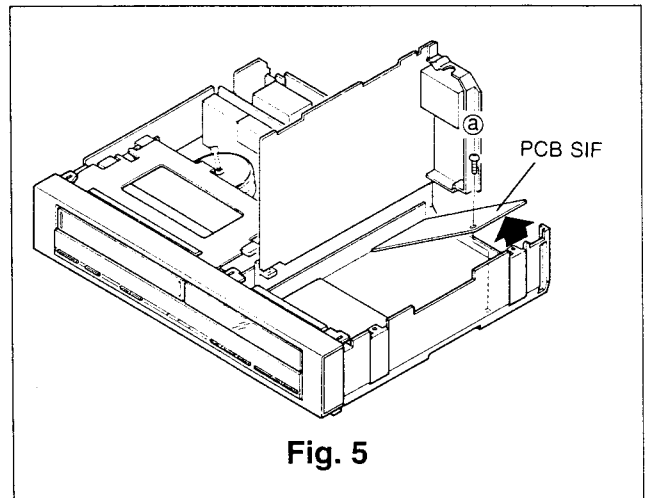


Fig. 5

4. Removal of PCB TIMER

- A. Remove the front panel. (Page 1, Item 2)
- B. Unfasten five stoppers(①~⑤), and remove the PCB TIMER, as shown in Fig. 6.

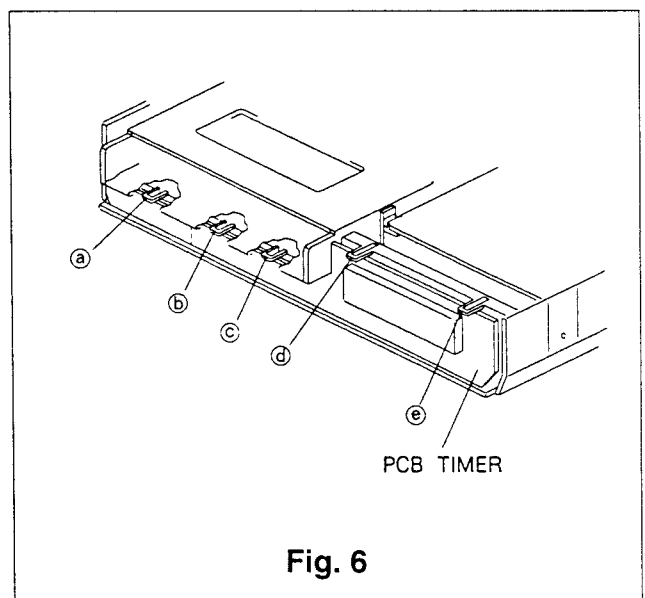


Fig. 6

5. Removal of PCB HEAD-AMP

- A. Remove the front panel (page1.Item2)
- B. Lift the shield cover upward to remove it.
- C. Disconnect the flat cable by gently pulling cover ① of the connector[GB], as shown in Fig. 7.
- D. Remove three screws(①~③).
- E. To service the solder side, remove the shield case A.
- F. To service the component side, unsolder four soldering points of the shield case B to remove it.

Note:

To service, with power on, use the extension cord (859C344O40) and ground the lead wire with a short lead.

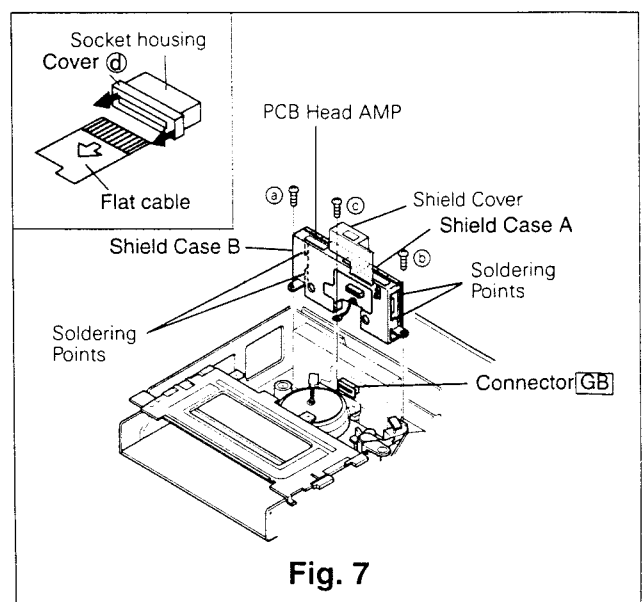


Fig. 7

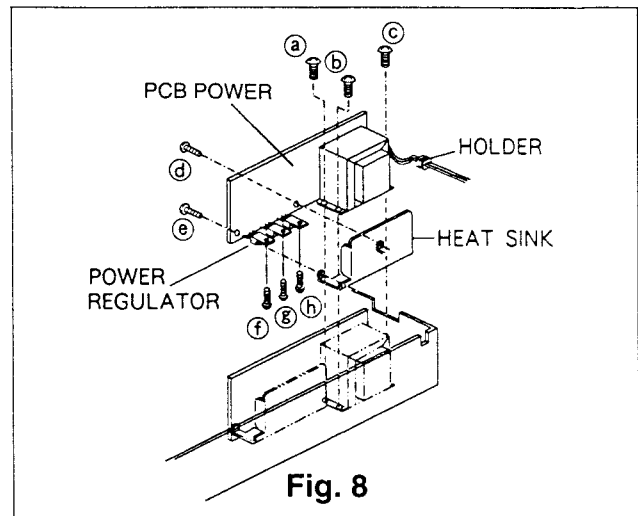
6. Removal of PCB POWER

[HS-M34(EE) only]

- Remove three screws (a~c), as shown in Fig. 8.
- Remove the holder of AC power cord from the base chassis and lift the PCB POWER upward.
- To service the component side, remove five screws (d~h).

CAUTION:

Power regulators are damaged if power supply is turned on without installing the heat sink.



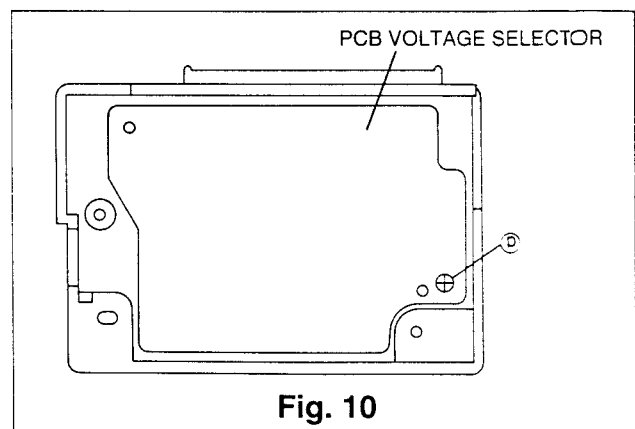
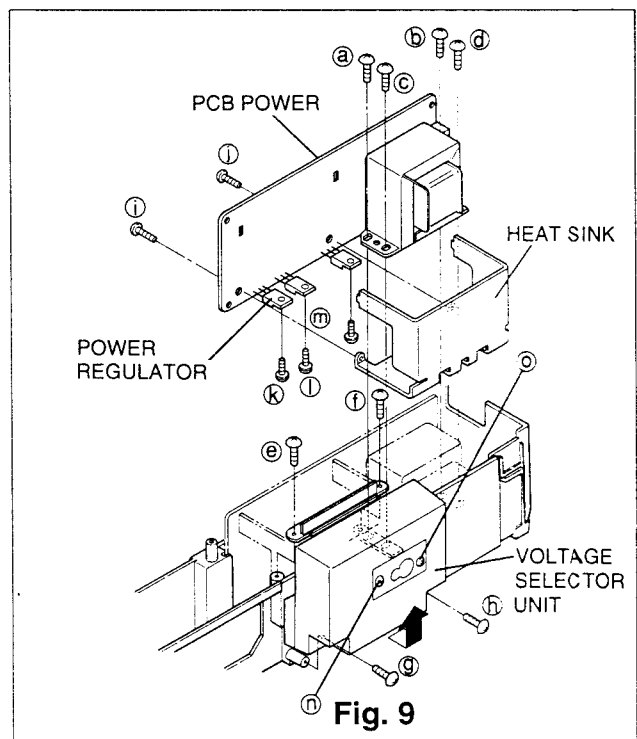
7. Removal of PCB POWER and PCB VOLTAGE SELECTOR

[HS-M34(P) only]

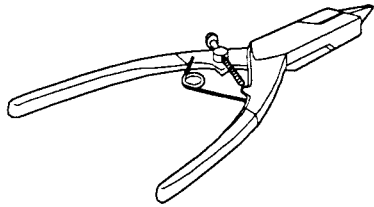
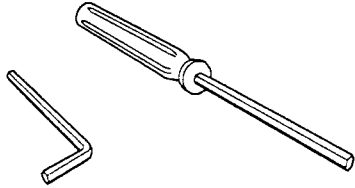
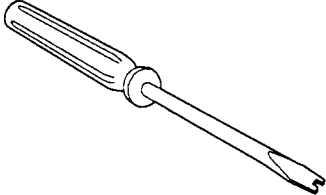
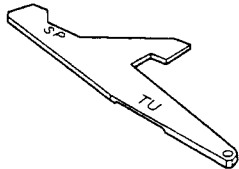
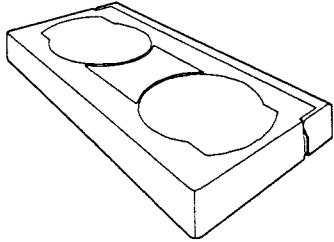
- Remove four screws (a~d) retaining the voltage selector unit, and remove four screws (e~h) retaining the PCB POWER as shown in Fig. 9.
- Lift the voltage select unit and the PCB POWER upward.
- To service the component side for PCB POWER, remove five screws (i~m).
- To service the component side for PCB VOLTAGE SELECTOR, remove two screws (n, o) as shown in Fig. 9, and remove a screw (p) as shown in Fig. 10.

CAUTION:

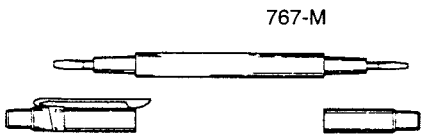
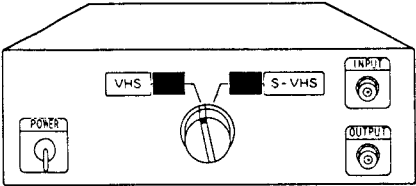
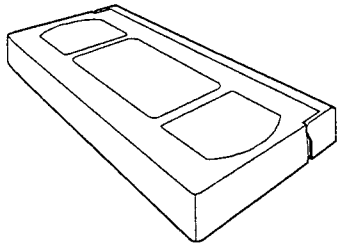
Power regulators are damaged if power supply is turned on without installing the heat sink.



MECHANICAL ADJUSTMENT TOOLS

	PURPOSE	METHOD
Grip ring fixer (859C347O50) 	A tool for preventing the grip ring from opening excessively.	While opening the grip ring with the tips of this tool, install the grip ring on to the shaft.
Hex Keys(1.5mm)  (859C259O20) (859C259O50)	The hex keys are used for tightening or removing hexagonal socket head screws which fasten the guide rollers.	Insert the given size(1.5mm) hexagonal socket and turn.
Adjustment Driver (859C259O80) 	For adjustment of guide rollers.	Carefully insert and adjust guide rollers.
Reel disk Adj. Jig (859C342O20) 	The height gauge is used for measuring height and perpendicularity of the reel disk and Take up guide arm.	The gauge is applied to the part being measured.
BackTension Gauge (859C345O80) 	The back tension gauge is used for measuring the tension of the tape on the supply side.	Load this gauge in the cassette housing and run in the play mode. Read the gauge indicator.
Extension Cord (859C344O40)	For PCB HEAD AMP service.	Use when repair of the PCB Head Amp is necessary.
Cotton gloves	For changing, cleaning and handling of drum, heads and guides.	Use when handling all parts in the tape path.

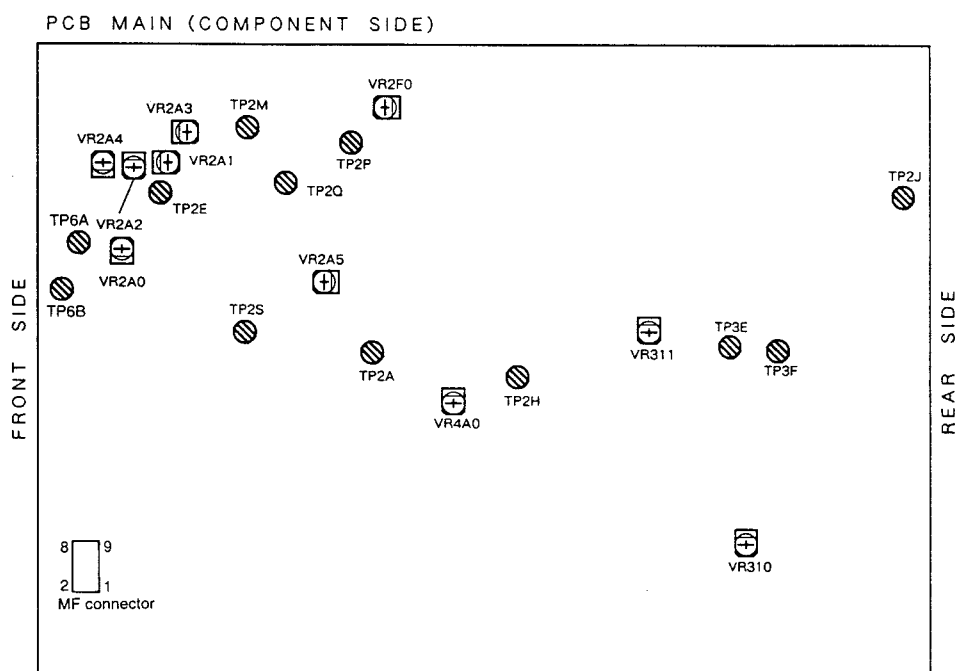
ELECTRICAL ADJUSTMENT TOOLS

	PURPOSE	METHOD
Adjustment Driver (859C338O00)  767-M	The adjustment driver is intended to adjust variable resistors, trimmers, transformers etc. in the circuitry.	Select a tip suitable for the particular head of the component concerned and adjust.
Carrier Checker (859C346O50) 	Used for the adjustment or inspection of the carrier set deviation.	Use in conjunction with the oscilloscope. For detail refer to the service manual or the attached data.
Alignment Tape (PAL:859C339O10) (NTSC:859C339O00) 	Standard signals (VHS Standard) are recorded on the alignment tape and reproduced when required in the adjustment of Y/C circuit, audio circuit and interchangeability alignment.	Install and run in the play mode, the same as for an ordinary tape.
Record Current Adjustment Jig (859C347O80)	For Y/C Recording Level adjust.	For Y/C Recording Level adjustment.

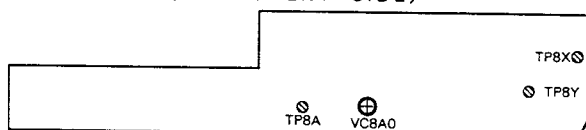
ELECTRICAL ADJUSTMENT

Circuit adjustments become necessary, in most cases, due to the wear of mechanical parts or following the replacement of critical components such as the video head, causing circuit adjustments to vary considerably. Should this occur, be sure to determine the nature of the defect and repair prior to proceeding with adjustments.

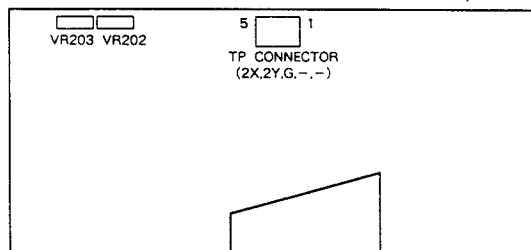
Always use the test equipment recommended for a given adjustment procedure. If the appropriate test equipment is not available, it is recommended that adjustments NOT be attempted. Refrain from the indiscreet adjustment of circuit adjustment control unless properly equipped to do so.



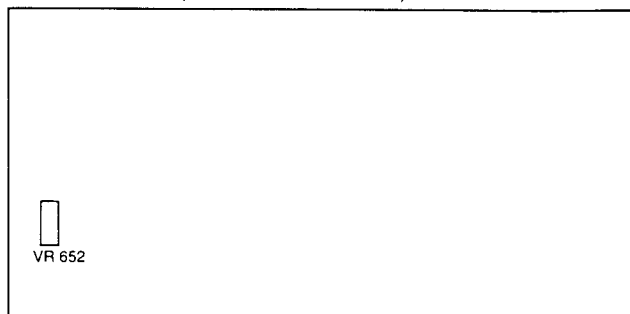
PCB TIMER (COMPONENT SIDE)



PCB HEAD AMP (COMPONENT SIDE)

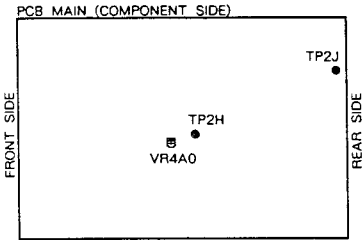
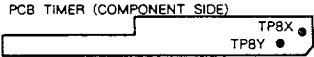
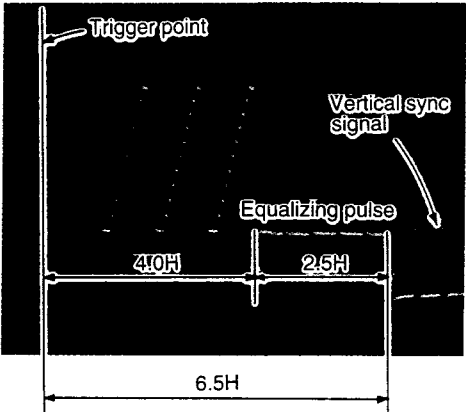


PCB CG/AFC (COMPONENT SIDE)



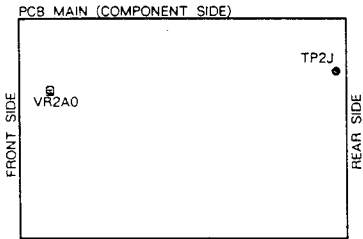
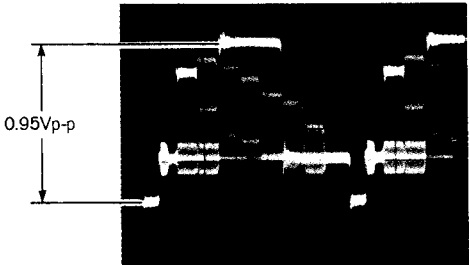
[Servo Circuit] 1.Playback Switching Point		Adjustment purpose: Video switch over timing during playback. Symptom when incorrectly adjusted: Switching noise or jitter on the reproduced picture.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 10:1)		Input signal	---
Test point	CH-1:TP2J CH-2:---	Using tape	Alignment tape (grey scale step signal)
EXT trigger	TP2H	VCR condition	Playback
Measurement range	DIV 20mV TIM 50 μ sec	Using Jig.	---

1. Short-circuit TP8X and TP8Y on PCB TIMER.
Confirm that the "DTR" displayed in Fluores cent Display flashed fast.
2. Observe TP2J.
3. Set the oscilloscope's slope to (-).
4. Adjust VR4A0 on PCB MAIN so that the trigger point is located at $6.5 \pm 1.0H$ before the vertical synchronizing signal.

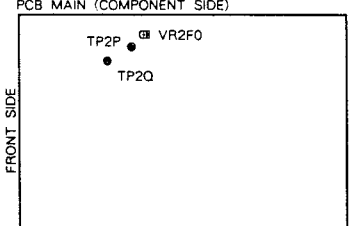
[Y/C Signal Circuit] 2.EE Output Level		Adjustment purpose: Output level of video signal at Stop mode. Symptom when incorrectly adjusted: Too bright or too dark image: colour signal is produced incorrectly.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 10:1)		Input signal	EXT signal (colour bar)
Test point	CH-1:TP2J CH-2:---	Using tape	---
EXT trigger	---	VCR condition	Stop
Measurement range	DIV 20mV TIM 10 μ sec	Using Jig.	---

1. Observe TP2J.
2. Adjust VR2A0 so that the amplitude of wave form is 0.95Vp-p.

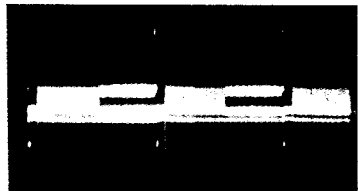



3.Noise Cancel		Adjustment purpose: S/N ratio and resolution of colour signal. Symptom when incorrectly adjusted: Poor S/N ratio; poor colour signal resolution.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 10:1)		Input signal	---
Test point	CH-1:TP2P CH-2:TP2Q	Using tape	Alignment tape (colour bar)
EXT trigger	---	VCR condition	Playback
Measurement range	DIV 20mV TIM 5msec	Using Jig.	---

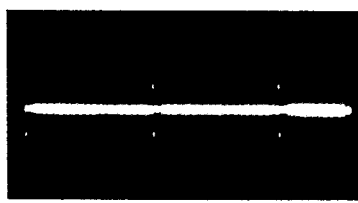
PCB MAIN (COMPONENT SIDE)



1. Set the oscilloscope's volt range of CH-1 and CH-2 must be the same range.
2. Set the oscilloscope to ADD mode and CH-2 to Invert mode.
3. Observes TP2P and TP2Q.
4. Adjust VR2F0 so that the amplitude of video signal is minimum.

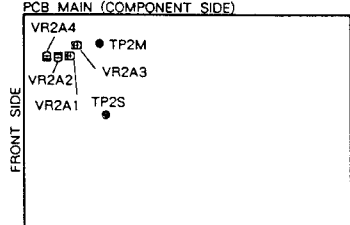




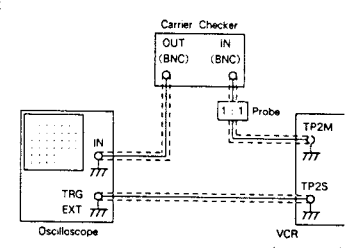


4.Carrier set, Deviation		Adjustment purpose: FM carrier frequency and frequency deviations. Symptom when incorrectly adjusted: Too bright or too dark image: colour signal is reproduced correctly. Horizontal noise or out of sync.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 1:1)		Input signal	EXT signal (colour bar)
Test point	CH-1:TP2M CH-2:---	Using tape	---
EXT trigger	TP2S	VCR condition	Stop
Measurement range	DIV 0.2V TIM 10μ sec	Using Jig.	Carrier checker

PCB MAIN (COMPONENT SIDE)

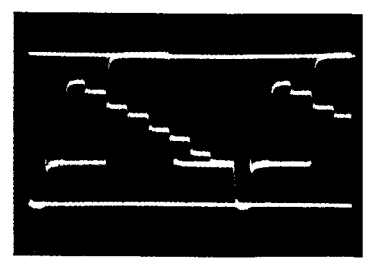


1. Turn VR2A4 fully clockwise and VR2A3 fully counter clockwise as seen from the component side.
2. Observe TP2M via the carrier checker.
3. Adjust VR2A2 and VR2A1 so that the response waveform 3.8MHz line and 4.8MHz just touch each of white lines on the oscilloscope.



4.8MHz

3.8MHz



5. White Clip and Dark Clip		Adjustment purpose: Sharpness of image contour or outline. Symptom when incorrectly adjusted: Blur image, white streaking, black streaking.		1. Observe TP2E. 2. Adjust VR2A3 and VR2A4 so that the overshoot appearing at the white peak side and the undershoot below sync tip are 100% and 65% respectively.
Measuring instrument and condition		VCR setup condition		
Oscilloscope (Probe 10:1)		Input signal	EXT signal (colour bar)	
Test point	CH-1: TP2E CH-2: ---	Using tape	---	
EXT trigger	TP2S	VCR condition	Stop	
Measurement range	DIV 50mV (VARIABLE mode) TIM 10 μ sec	Using Jig.	---	

PCB MAIN (COMPONENT SIDE)

6. Y/C Recording Level		Adjustment purpose: Level of video signal just before recording on tape. Symptom when incorrectly adjusted: Low luminance signal S/N ratio, beats, colour bounding of chrominance signal or flicker.		1. Observes TP connector pin ⑤ and pin ④ via the REC current ADJ. JIG. 2. Turn VR203 fully counter clockwise as seen from the top side. 3. Adjust VR202 so that the amplitude of cyan level is 50mVp-p.
Measuring instrument and condition		VCR setup condition		
Oscilloscope (Probe 1:1)		Input signal	EXT signal (colour bar)	
Test point	TP connector pin ⑤ and pin ④	Using tape	A tape	
EXT trigger	TP2S	VCR condition	LP Record	
Measurement range	DIV 10mV TIM 10 μ sec	Using Jig.	REC Current ADJ. JIG	

PCB HEAD AMP (COMPONENT SIDE)

Head Amp PCB TP Connector

REC CURRENT ADJ. JIG
No. 859C347080

4. Set the oscilloscope's probe to 10:1.
 5. Set the oscilloscope's volt range to 5mV/div.
 6. Adjust VR203 so that the amplitude of horizontal sync is 200mVp-p.

7. Playback Video Output Level		Adjustment purpose: Video output level during playback.	
		Symptom when incorrectly adjusted: Colour signal is not correctly reproduced.	
Measuring instrument and condition		VCR setup condition	
Oscilloscope (Probe 10:1)		Input signal	---
Test point	CH-1:TP2J CH-2:---	Using tape	Alignment tape (colour bar)
EXT trigger	---	VCR condition	Playback
Measurement range	DIV 20mV TIM 10 μ sec	Using Jig.	---

Perform the EE output level adjustment (ITEM 2) before this adjustment.

1. Set INTELLIGENT PICTURE to "I.P.OFF" position on the MENU picture.
2. Be certain that nothing is connected to the VIDEO out terminal.
3. Observe TP2J.
4. Adjust VR2A5 so that the amplitude of waveform is 1.0Vp-p.

PCB MAIN (COMPONENT SIDE)

1.0Vp-p

8. N-PAL VCO (HS-M34(P) only)		Adjustment purpose: Frequency of gate pulse used sample the burst signal which is used to convert NTSC signal to a pseudo PAL signal.	
		Symptom when incorrectly adjusted: No colour signal during playback of NTSC picture in PAL mode.	
Measuring instrument and condition		VCR setup condition	
Frequency counter		Input signal	---
Test point	TP6B	Using tape	Alignment tape (NTSC colour bar)
EXT trigger	---	VCR condition	Playback
Measurement range	---	Using Jig.	---

Turn on power over 30 seconds before this adjustment for complete warm up.

1. Short-circuit TP6A and MF connector pin 3 (SW5V).
2. Observe TP6B.
3. Adjust VR652 so that the frequency is 15.73 $\pm$ 0.05kHz.
4. Open-circuit TP6A and MF connector pin 3 (SW 5V).

PCB MAIN (COMPONENT SIDE)

PCB CG (COMPONENT SIDE)

[Audio Circuit] 9.Playback Audio Level		Adjustment purpose: Audio level during playback. Symptom when incorrectly adjusted: Too loud or too low audio level during playback.	
Measuring instrument and condition		VCR setup condition	
Audio Tester		Input signal	---
Test point	AUDIO OUT terminal	Using tape	Alignment tape (1kHz audio signal)
EXT trigger	---	VCR condition	Playback
Measurement range	---	Using Jig.	---

1. Observe AUDIO OUT terminal.
2. Adjust VR311 so that the audio output level is -6dBs (388mVr.m.s.). (0dBs=1mW600Ω:0.775Vr.m.s.)
3. Check that the level fluctuation is less than ±1dBs.
If level fluctuation is over ± 1dBs then check that the mechanical adjustment of A/C HEAD slant.

PCB MAIN (COMPONENT SIDE)

10.Audio Bias Level		Adjustment purpose: Audio bias level during recording. Symptom when incorrectly adjusted: Low high frequency response of audio signal.	
Measuring instrument and condition		VCR setup condition	
Audio tester		Input signal	EXT signal (colour bar)
Test point	TP3E TP3F	Using tape	A tape
EXT trigger	---	VCR condition	Record
Measurement range	---	Using Jig.	High pass filter

1. Insert a shorted RCA type Phono-plug into the AUDIO IN terminal.
2. Observes TP3E and TP3F via high pass filter.
3. Confirm that the monitor TV etc. dose not affect the indication of the audio tester and then adjust VR310 so that the level of 2.6mVr.m.s.

Note 1:
Be careful that the audio tester housing does not touch the VCR chassis.

Note 2:
Do not set the VCR to PLAY mode with the audio tester connected.
(The audio amplifier will be overloaded.)

PCB MAIN (COMPONENT SIDE)

C - ELE 16V/10 μ F

0.1 μ F-K
150 Ω-J

[Timer Circuit] 11.Clock OSC Frequency		Adjustment purpose: Accuracy of clock. Symptom when incorrectly adjusted: Poor cock accuracy.	
Measuring instrument and condition		VCR setup condition	
Frequency counter		Input signal	---
Test point	TP8A	Using tape	---
EXT trigger	---	VCR condition	Stand by
Measurement range	PERIOD mode	Using Jig.	---

1. Observe TP8A.

2. Adjust VC8A0 so that the period is 5.859375 ± 0.000024 msec.

PCB TIMER (COMPONENT SIDE)

MECHANICAL ADJUSTMENT AND REPLACEMENT

1. Cleaning of Deck

The following parts require cleaning whenever serviced to maintain satisfactory performance.

1-1 Video Head

A. Clean the video heads in the following method if dust and other foreign objects on the video heads disturb the normal playback of images:

Dampen video head cleaning cloth with alcohol. Hold the cloth against the drum and turn the drum slowly counterclockwise to clean.

Note:

Do not directly touch the head attached to the upper drum. The head is very hard but brittle to impact, especially in the vertical direction.

Do not apply force in the vertical direction.

B. Allow residual alcohol to dry thoroughly before running tape. Otherwise, the liquid may stick to and damage the tape.

1-2 Tape Transport(Refer to Fig. 1-1.)

Clean the following parts of the tape transport.

1. Tension regulation arm S
2. Tension arm
3. Supply guide pole
4. FE head

5. Impedance roller
6. Supply guide roller
7. Supply slant pole
8. Upper and lower drum
9. Takeup slant pole
10. Takeup guide roller
11. A/C head
12. Takeup guide pole
13. Pinch roller
14. Capstan shaft
15. Takeup guide arm
16. Tension regulation arm T

A. Clean the tape transport with gauze dampened with alcohol, except the supply and takeup guide rollers. If Guide rollers are stained with dust, clean them with dry gauze or exchange them for new parts.

B. Allow residual alcohol to dry thoroughly before running a tape. Otherwise the liquid may stick to and damage the tape.

1-3 Reel Disk Drive System

A. Clean the reel disk braking surfaces and the reel belt.

B. Clean the above parts with gauze dampened with alcohol.

C. Allow the residual liquid to dry thoroughly before operating the reel disk.

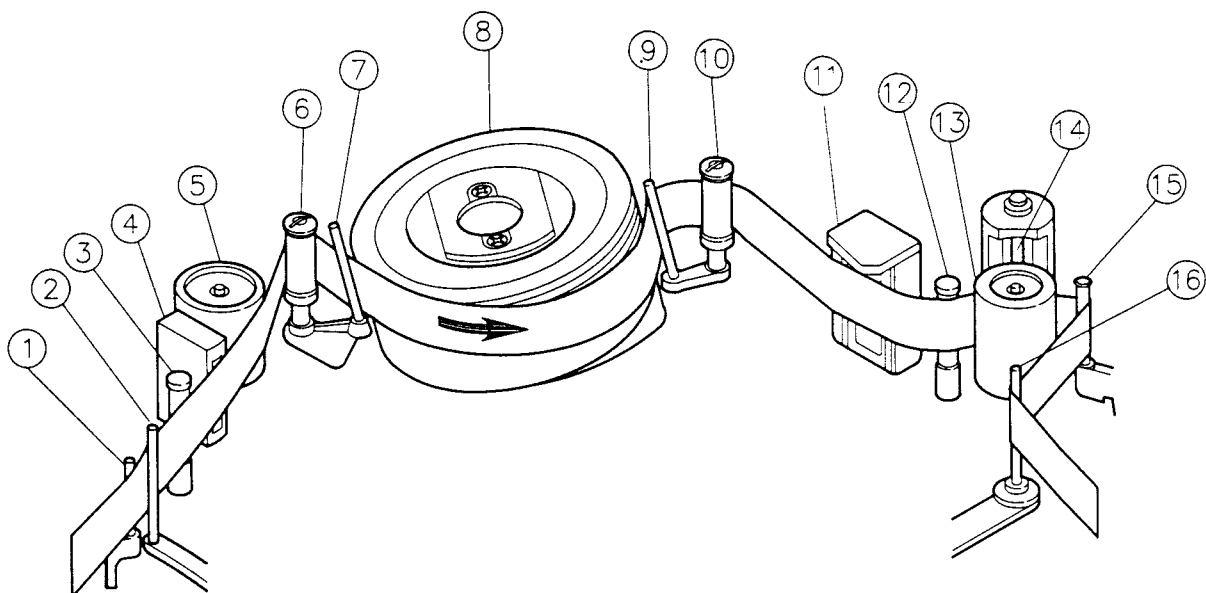


Fig. 1-1

F0D001

2. Replacement of Major Parts

2-1 Cassette Housing

2-1-1 Removal(Refer to Fig. 2-1-1~2-1-2.)

- Set the VCR to the eject mode.
- Remove the top cover, bottom cover, and front panel.
- Unfasten the snap of the cable holder and remove the cable holder from the cassette housing as shown in Fig. 2-1-1.
- Unscrew four cassette housing fastening screws [(a),(b),(c) and (d)]. Raise the cassette housing slowly in the direction shown by the arrow.(Refer to Fig. 2-1-2.)

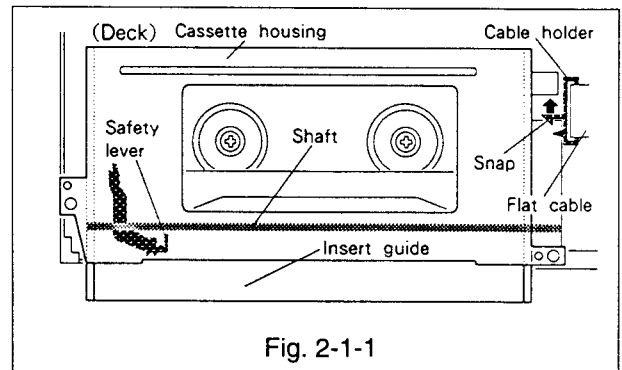


Fig. 2-1-1

2-1-2 Installation(Refer to Fig. 2-1-1~2-1-3.)

- Slowly lower the cassette housing onto the main plate of the deck so that the safety lever enters between the insert guide and the shaft as shown in Fig. 2-1-1. Align the two positioning holes [(e) and (f)] and the two U holes [(g) and (h)] located on the cassette housing with the matching holes in the deck.
- In step A above, if the front loading gear of the cassette housing does NOT engage the boss on the main plate, carefully push the gear toward the front of the VCR using a small-diameter screwdriver, as illustrated in Fig. 2-1-3. If the gear still will not engage, rotate the Front Loading Gear a few degrees from below the deck until the gear engages the boss correctly.
- Fasten the housing to the deck with the four screws [(a),(b),(c) and (d)].(Refer to Fig. 2-1-2.)

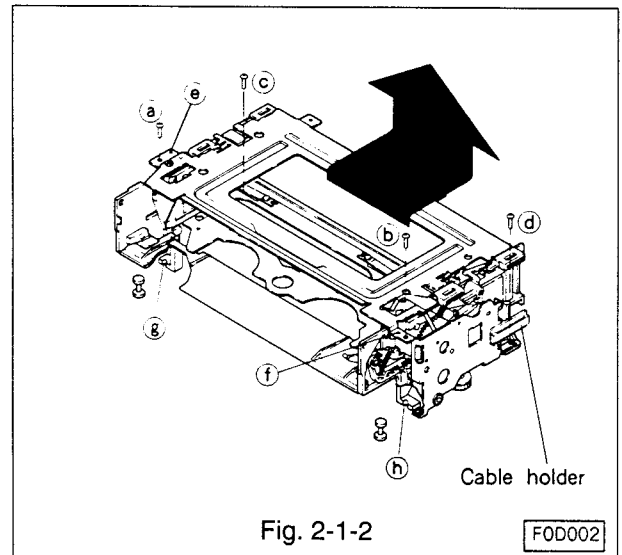


Fig. 2-1-2

F0D002

2-2 Lock arm and Drive gear

2-2-1 Removal(Refer to Fig. 2-1-3~2-2.)

- Unfasten four snaps [(a),(b),(c) and (d)] as shown in Fig. 2-1-3, and remove the side plate TU.
- Turn the FL SW lever clockwise to separate the FL SW lever from the drive gear, and pull the lock arm and drive gear to remove them from the shaft as shown in Fig. 2-2.

2-2-2 Installation(Refer to Fig. 2-1-3~2-2.)

- Install the drive gear on the shaft as shown in Fig. 2-2.
- Line the matching mark on the drive gear and beginning of gear section on the lock arm as shown in Fig. 2-2, and install the lock arm.
- Install the side plate TU to the cassette housing, and secure it with four snaps [(a),(b),(c) and (d)] as shown in Fig. 2-1-3.

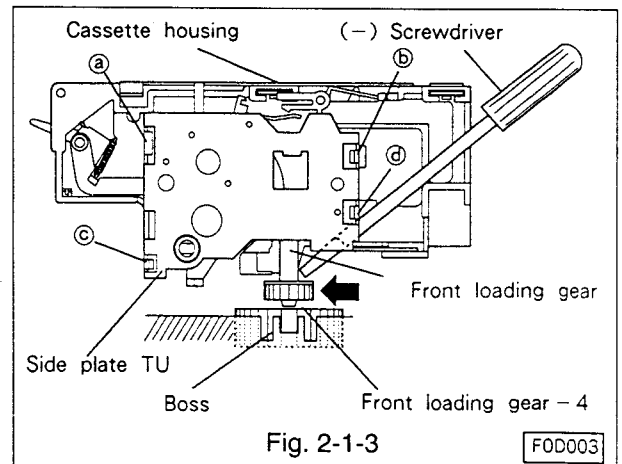


Fig. 2-1-3

F0D003

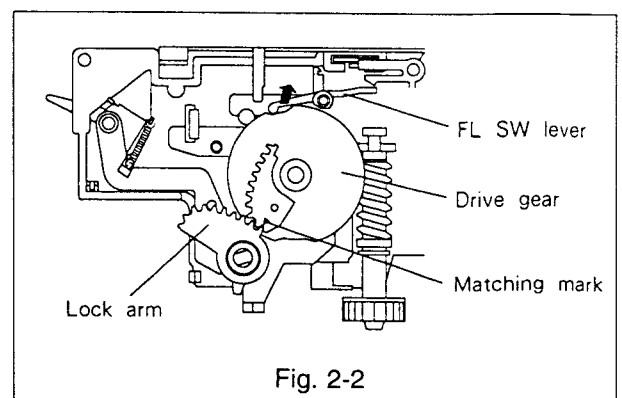


Fig. 2-2

2-3 Drum Assembly

2-3-1 Removal(Refer to Fig. 2-3-1~2-3-3.)

- A. Unscrew the brush fastening screw and remove the brush.(Refer to Fig. 2-3-1.)
- B. Unscrew two fastening screws[(a) and (b)] and remove the PCB HEAD AMP which is connected to the drum assembly.

Note:

The cable and connector between the drum and head amplifier may be damaged if the cable is pulled strongly, as the cable is short.

Remove the shield cap of the PCB, raise the PCB slightly and disconnect the flat cable.

(Removal method for the flat cable connector and stopper is shown in Fig. 2-3-3.)

Disconnect the grounding wire and remove the PCB HEAD AMP.

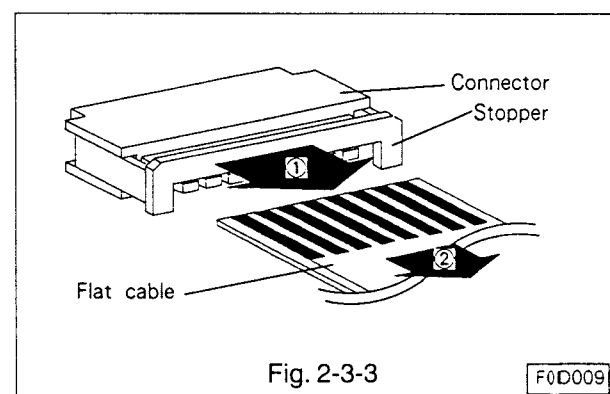
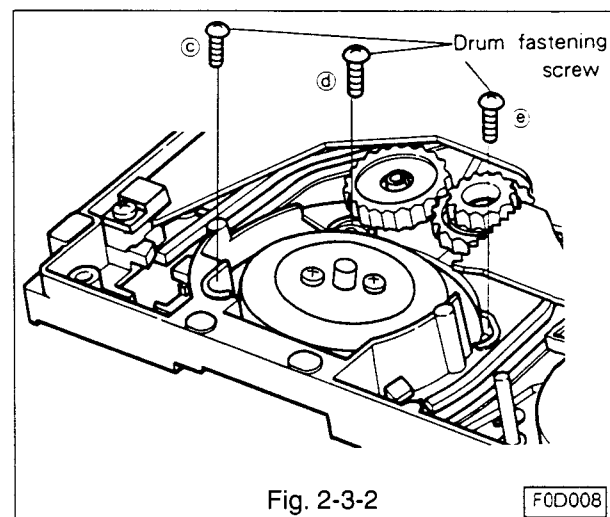
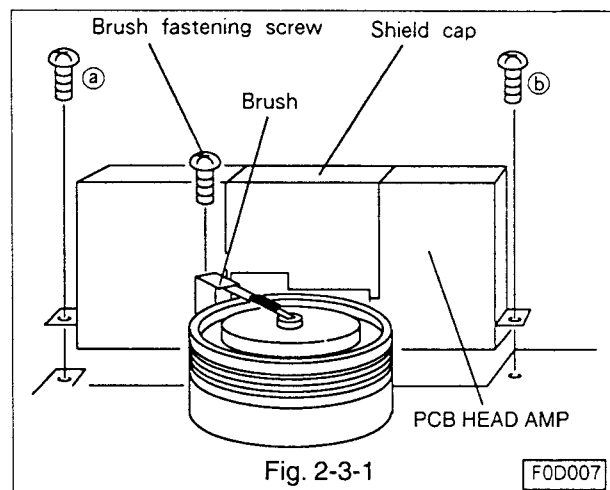
- C. Unscrew three drum fastening screws[(c),(d) and (e)]from the reverse side of the deck.(Refer to Fig. 2-3-2.)
- D. Remove the drum assembly by raising it with care not to touch other parts around the drum assembly.
- E. Disconnect the connectors from the drum assembly.
(Refer to Fig. 2-3-3.)

2-3-2 Installation (Refer to Fig. 2-3-1,2-3-2.)

- A. Connect the connectors to a new drum assembly.
- B. Place the new drum assembly on the main plate of the deck slowly with care not to touch other parts.
- C. Fasten the drum assembly with three fastening screws[(c),(d) and (e)]on the reverse side of the deck.
(Refer to Fig. 2-3-2.)
- D. Connect the PCB HEAD AMP to the drum assembly and fasten the PCB with two screws[(a) and (b)].(Refer to Fig. 2-3-1.)

Note:

Conduct the mechanism interchangeability adjustment outlined in Para.3 to give optimum performance when the drum assembly is replaced.



2-4 Upper Drum

2-4-1 Removal(Refer to Fig. 2-4-1.)

- Unscrew the brush fastening screw and remove the brush.
- Unsolder two inside soldered terminals of each head on the upper drum.
- Unscrew the upper drum fastening screws.
- Remove the upper drum slowly and carefully.

Note:

If the upper drum is difficult to remove, heat the upper drum fastening screw holes with a soldering iron, and the drum will be easily removed.

2-4-2 Installation(Refer to Fig. 2-4-1.)

Note:

Handle the upper drum carefully as the video heads are fragile.

- Position the lower drum so that the hole in the shaft faces the operator. Align the upper drum with the lower drum so that the CH1 mark on the upper drum is on the right side, and couple the drums.
- Fasten the upper drum with two screws.(Tighten the screws alternately.)
- Solder the terminals not soldered on the upper drum.
- Clean the video heads as outlined in Para. 1-1.

2-5 Reel Belt(Refer to Fig. 2-5)

- Remove the reel belt from the capstan motor and the belt pulley.
- Install a new reel belt.

Note:

Make certain that the new belt is free from grease, before installing.

2-6 Capstan Motor

2-6-1 Removal(Refer to Fig. 2-5, 2-6)

- Disconnect the flat cable.
- Remove the reel belt.(Refer to Fig. 2-5.)
- Remove three fastening screws shown in Fig. 2-6 and remove the capstan motor.

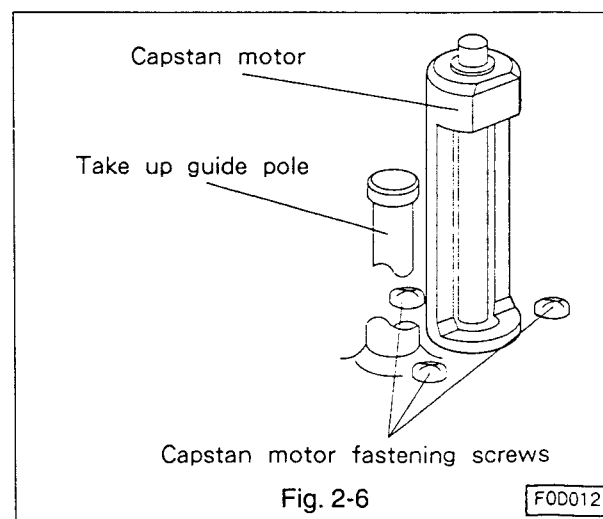
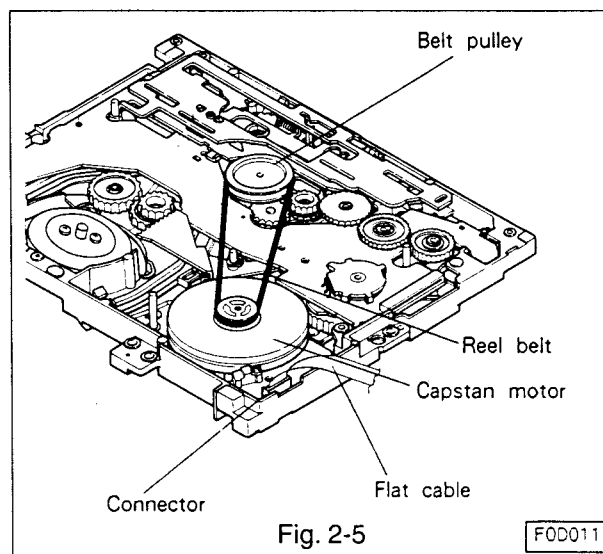
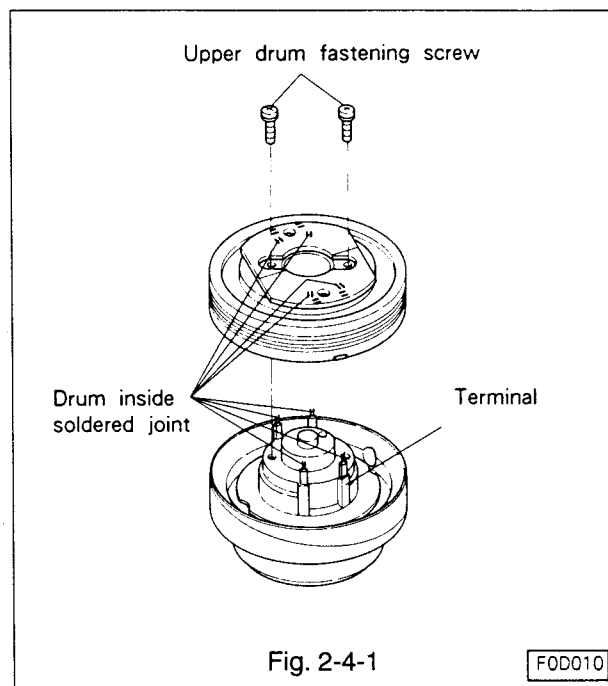
CAUTION:

Restrain the capstan motor as the three screws are removed, since an un-restrained motor may damage other parts of the deck.

When performing removal or installation of the capstan motor, take care that the outside of the rotor's rim is not greased.(Refer to Fig.2-5.) If greasy components are attached on the outside of the rotor's rim, wipe them off with a dry cloth because they may cause defects during special effects playback.

2-6-2 Installation(Refer to Fig. 2-5, 2-6.)

- Fasten the motor with three fastening screws.(Refer to Fig. 2-6.)
- Install the reel belt.
- Connect the flat cable.



2-7 Loading Motor

2-7-1 Removal(Refer to Fig. 2-7-1, 2-7-2.)

- Set the VCR to the eject mode.
- Disconnect the wires from the loading motor.
- Remove two stoppers securing the motor and the motor holder plate.(Refer to Fig. 2-7-2.)
- Slide the motor and motor holder plate away, and then raise them to remove.
- Remove the belt-LM from the loading motor and the pulley-L.(TYPE-B only)(Refer to Fig. 2-7-1.)
- Unscrew two screws and detach the motor holder plate from the motor.
- Disconnect the coupling from the motor.

2-7-2 Installation(Refer to Fig. 2-7-1~2-7-3.)

- Fasten the coupling to a new loading motor.(Refer to Fig. 2-7-3.)
- Fasten the motor holder plate to the motor with two screws.(Refer to Fig. 2-7-1.)
- Install the belt-LM.(TYPE-B only)
- Place the motor and motor holder plate in the motor holder to the resr of the deck.
- Turn the motor shaft so that the coupling on the loading motors shall match the worm gear of the motor holder. Slide the loading motor forward and secure it with the stoppers.
- Solder the leads to the loading motor. (Brown lead wire to the positive terminal and red lead wire to the negative terminal.)

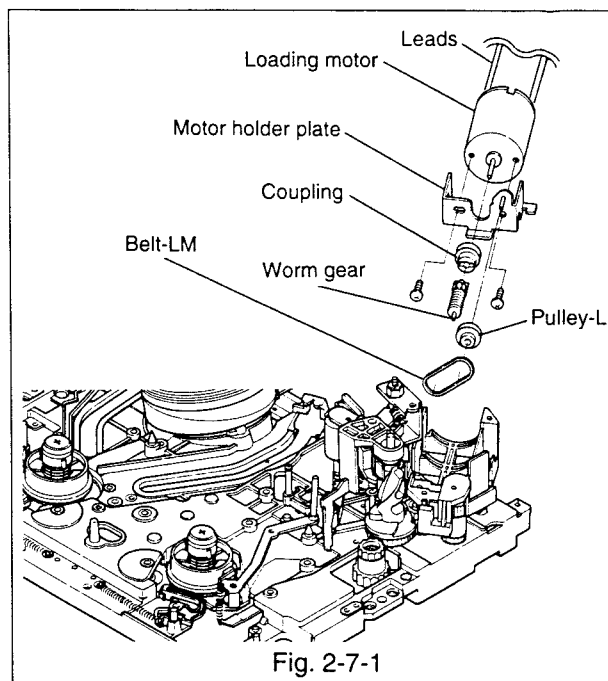


Fig. 2-7-1

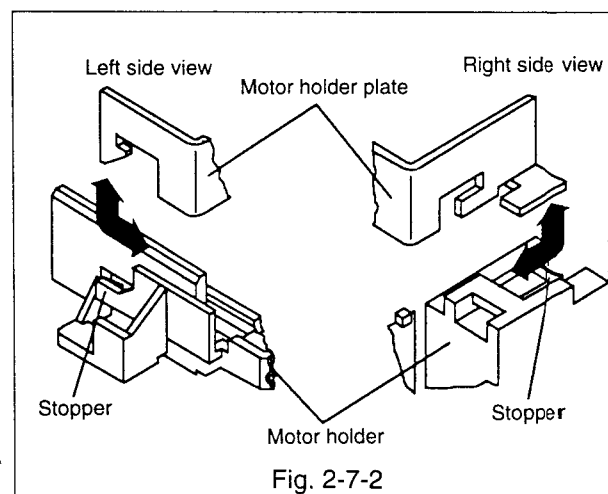


Fig. 2-7-2

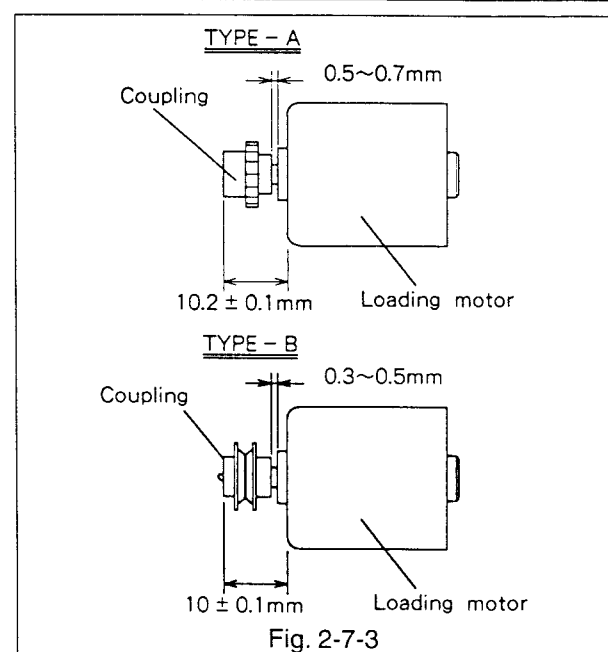


Fig. 2-7-3

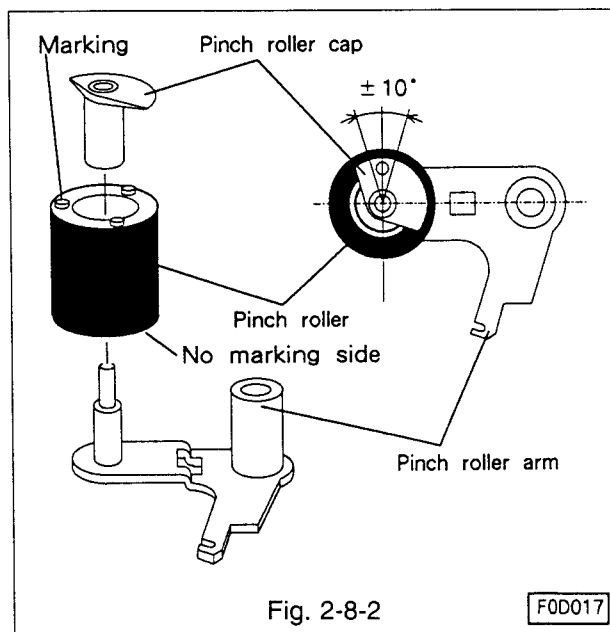
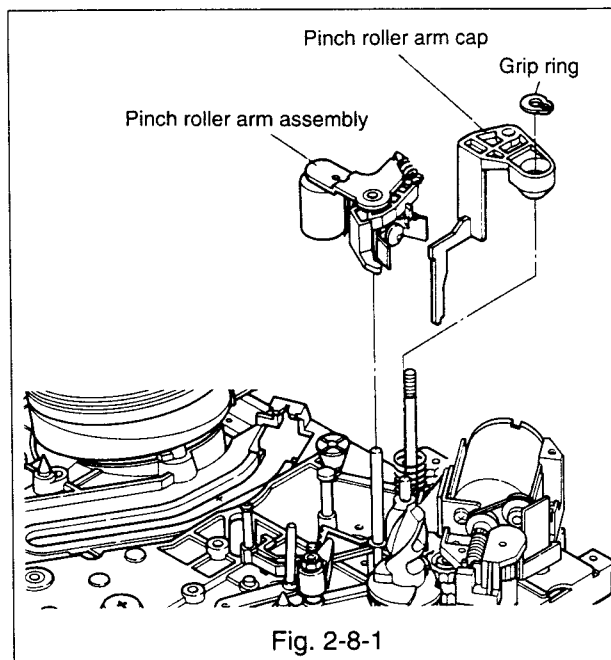
2-8 Pinch Roller

2-8-1 Removal(Refer to Fig. 2-8-1, 2-8-2.)

- A. Set the VCR to the eject mode.
- B. Remove the pinch roller arm cap and the grip ring which secures the pinch roller arm assembly.(Refer to Fig. 2-8-1.)
- C. Pull the pinch roller arm assembly upwards to remove.
- D. Remove the pinch roller cap from the pinch roller arm, and remove the pinch roller. (Refer to Fig. 2-8-2.)

2-8-2 Installation(Refer to Fig. 2-8-1,2-8-2.)

- A. Assemble the pinch roller cap and the pinch roller to the pinch roller arm by exercising care with the installation angle of the pinch roller cap and the marking of the Pinch Roller. (Refer to Fig. 2-8-2.)
- B. Assemble the pinch roller assembly to the shaft on the main plate.(Refer to Fig. 2-8-1.)
- C. Secure the pinch roller arm assembly with the pinch roller arm cap and the grip ring.



2-9 Mode Switch

Note:

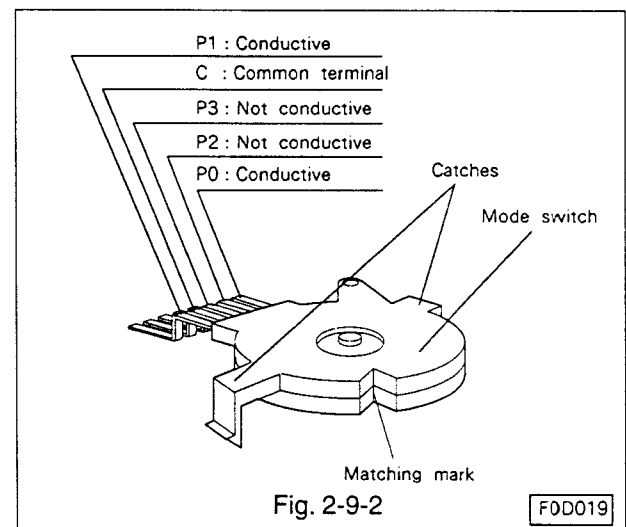
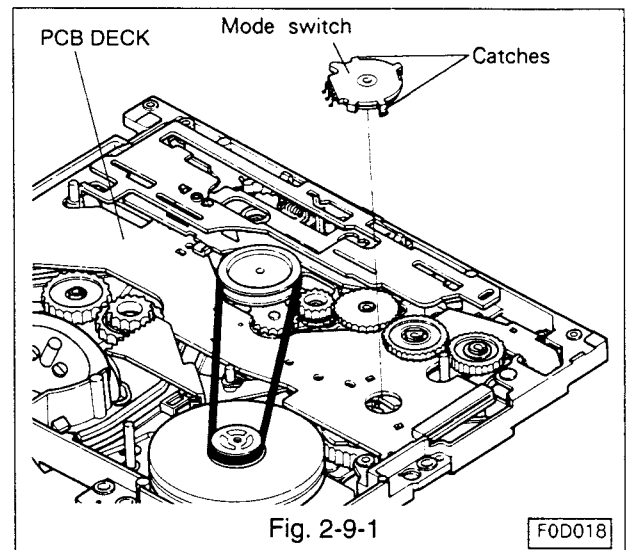
Replace the mode switch with the VCR in the eject mode.

2-9-1 Removal(Refer to Fig. 2-9-1)

- A. Unsolder the five soldered joints of the mode switch from the PCB DECK.
- B. Unfasten two catches fastening the switch to the PCB DECK assembly.
(Exercise care as the catches may be broken off.)
- C. Remove the mode switch slowly while ensuring that the soldered joints are all unsoldered.

2-9-2 Installation(Refer to Fig. 2-9-1,2-9-2.)

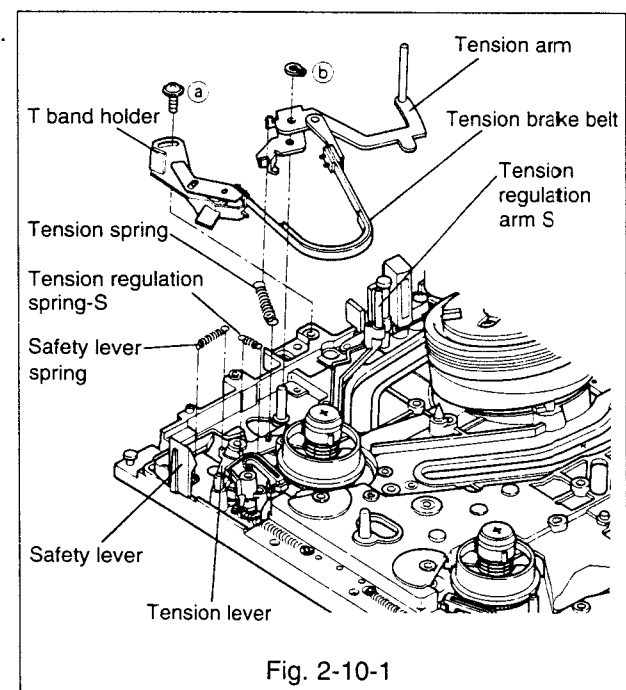
- A. Line the matching marks of the mode switch. (Refer to Fig. 2-9-2.)
- B. Finely adjust the mode switch so that continuity at each terminal shall be as given in the illustration.
- C. Fasten the switch to the PCB DECK with care so that the switch shall not turn, and secure with two catches.(Refer to Fig. 2-9-1.)
- D. Solder the five terminals which connect the mode switch to the PCB DECK assembly.



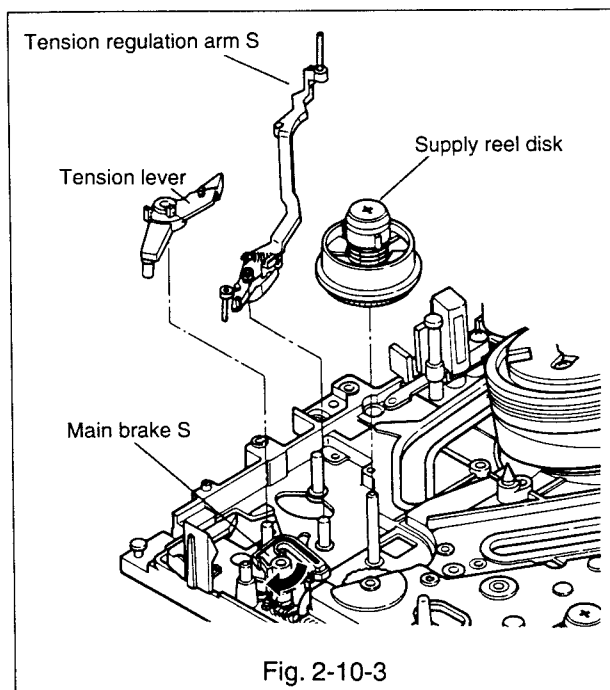
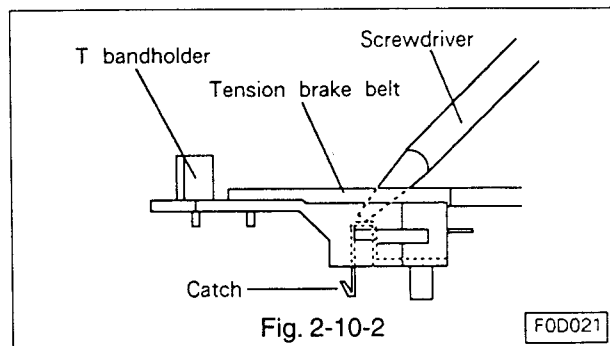
2-10 Supply Reel Disk

2-10-1 Removal (Refer to Fig. 2-10-1~2-10-3.)

- A. Remove the cassette housing as in Para. 2-1-1.
- B. Unscrew the screw (a) which fastens the T band holder. (Refer to Fig. 2-10-1.)
- C. Unfasten the catch of the T band holder from the main plate with a small screw driver etc. as shown in Fig. 2-10-2. Raise and remove the T band holder with care not to score or dirty the tension brake belt.
- D. Detach the tension spring from the tension arm and the tension lever.(Refer to Fig. 2-10-1.)
- E. Remove the grip ring (b) which secures the tension arm. Raise the tension arm upward to remove it from the shaft.
- F. Detach the tension regulation spring S from the tension regulating arm S and the tension lever.
- G. Detach the safety lever spring from the safety lever and the tension lever.



- H. Raise the tension lever avoiding the main brake S and remove the lever from the shaft.(Refer to Fig. 2-10-3.)
- I. Raise the tension regulation arm S and remove it from the shaft.
- J. While turning the main brake S slightly clockwise to separate the brake from the supply reel disk, and raise the supply reel disk to remove it from the shaft.(Refer to Fig. 2-10-3.)



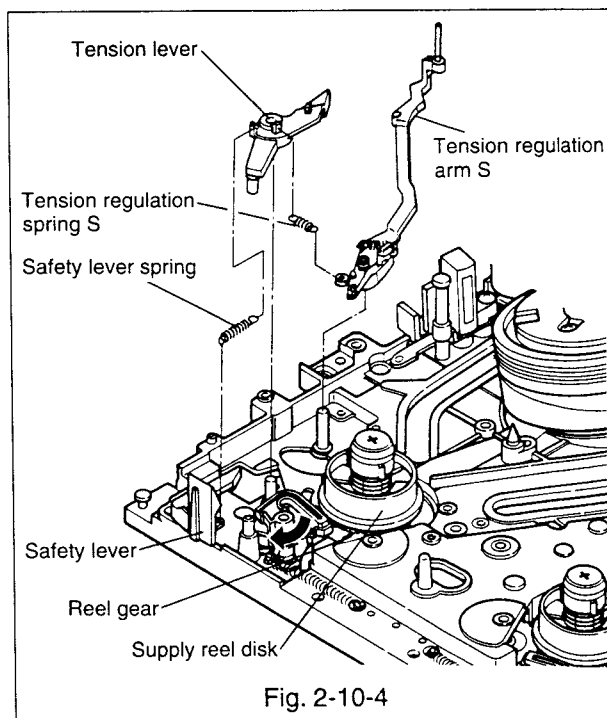
2-10-2 Installation(Refer to Fig. 2-10-4~2-10-7.)

- A. Turn the main brake S slightly clockwise to separate it from the supply reel disk shaft, and mount the supply reel disk on the shaft so that the reel gear meshes with the gear of the supply reel disk.
- B. Assemble the tension regulation arm S to the shaft.
- C. Assemble the tension lever to the shaft avoiding the main brake S.

Note:

Install the tension lever so that the pin at the lower part of the lever shall be in front of the slot in the main plate(viewing the front).

- D. Fasten the safety lever spring to the safety lever and the tension lever.
- E. Fasten the tension regulation spring S to the tension regulation arm S and the tension lever.



- F. Assemble the tension arm to the shaft and secure the arm with the grip ring(b).(Refer to Fig. 2-10-5.)
- G. Fasten the tension spring to the tension arm and the tension lever.(Refer to Fig. 2-10-5.)
- H. Assemble the T band holder to the main plate with care not to score or dirty the tension brake belt, and secure the holder with the screw(a) lightly.(Refer to Fig. 2-10-5.)

Note:

In the assembly of the T band holder, make certain that the hook of the holder positively engages with the reverse side of the main plate.

If the hook is difficult to engage with the main plate, push the hook lightly with a small screw driver etc.(Refer to Fig. 2-10-2.)

- I. Separate the main brake S and the tension regulation arm S from the supply reel disk and make certain that the disk turns freely.(Refer to Fig. 2-10-3.)
- J. Place the reel disk adjusting jig(Part Number 859C342O20) in the reference position on the main plate.(Refer to Fig. 2-10-6.)
- K. Slowly turn the jig about the point A and make sure that the height of the supply reel disk flange shall agree with the point B on the supply disk adjusting side of the jig (marked SP).(Refer to Fig. 2-10-7.)
- L. If the height of the disk is not satisfactory, hold the disk so that it shall not turn, and turn the height adjusting screw at the top of the disk to adjust the height. (Refer to Fig. 2-11-3.)
 - A) Turn the screw clockwise if the measured height is low.
 - B) Turn the screw counterclockwise if the measured height is high.
- M. On completion of adjustment, lock the height adjusting screw by burning it with the tip of the hot iron.
- N. Install the cassette housing as in Para. 2-1-2.
- O. Adjust back tension and tension pole position as outlined in Para. 3-1.

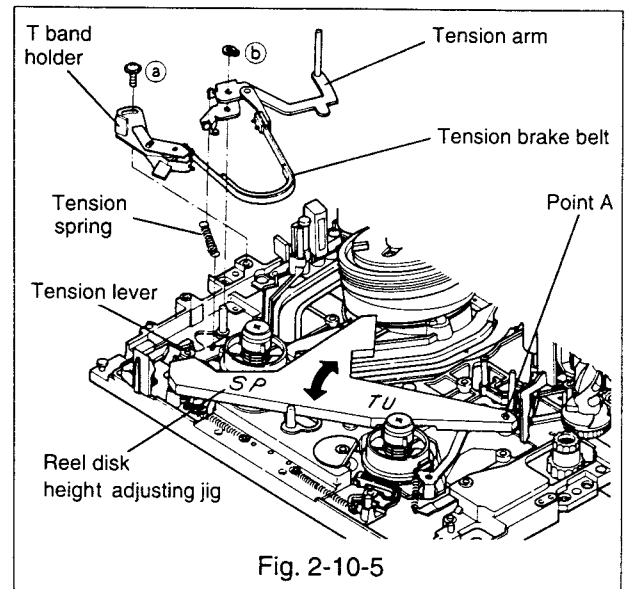


Fig. 2-10-5

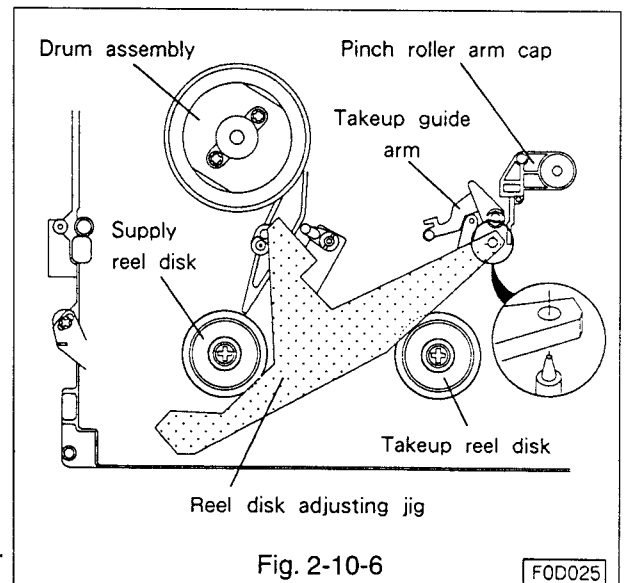


Fig. 2-10-6

F0D025

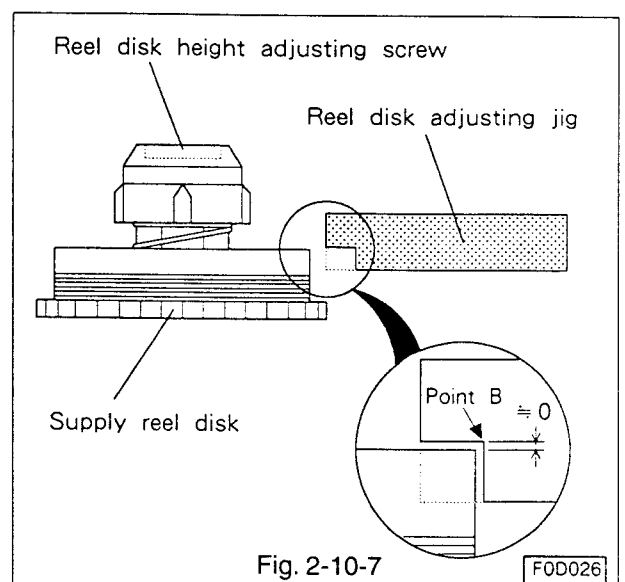


Fig. 2-10-7

F0D026

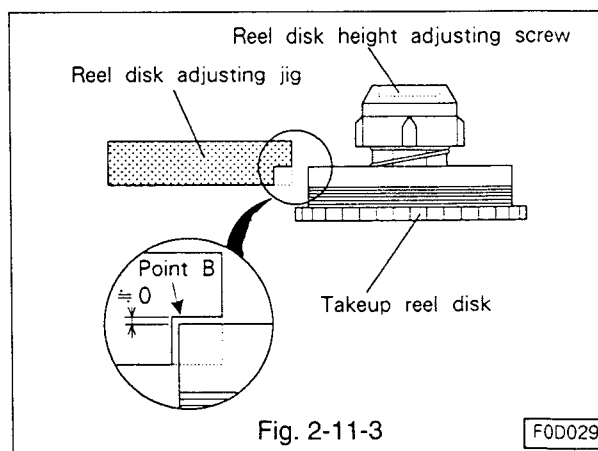
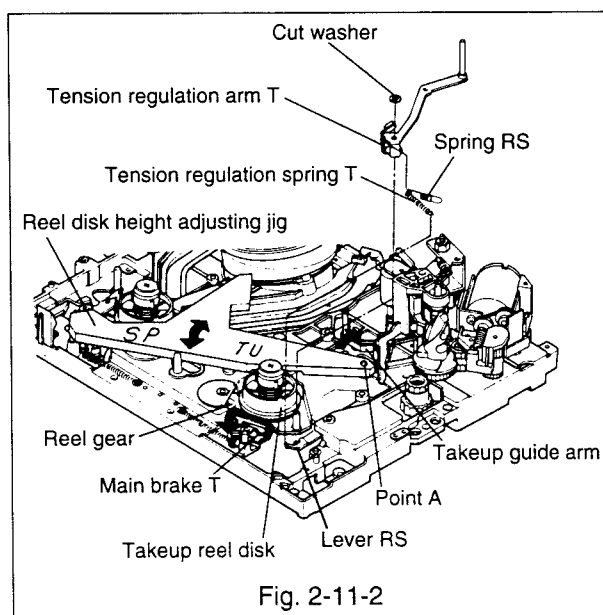
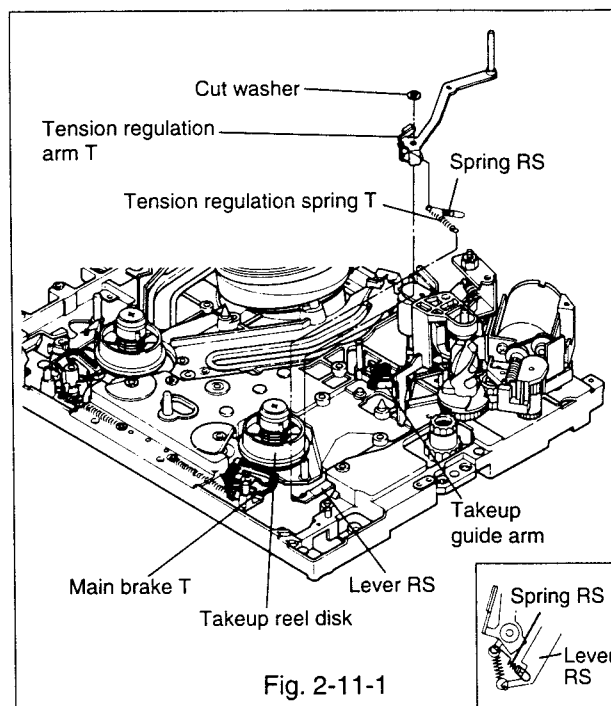
2-11 Takeup Reel Disk

2-11-1 Removal(Refer to Fig. 2-11-1.)

- Remove the cassette housing as in Para. 2-1-1.
- Detach the spring RS and the tension regulation spring T from the tension regulation arm T and the lever RS.
- Remove the cut washer which fastens the tension regulation arm T.
- Turn the takeup guide arm slightly clockwise and raise the tension regulation arm T to remove it from the shaft.
- Turn the main brake slightly counter-clockwise to separate the brake from the takeup reel disk and raise the disk upwards to remove it from the shaft.

2-11-2 Installation(Refer to Fig. 2-11-2, 2-11-3.)

- Turn the main brake T slightly counter-clockwise to release the takeup reel disk shaft. Slip the takeup reel disk onto the shaft so that the gear of the takeup reel shall mesh with the reel gear.(Refer to Fig. 2-11-2.)
- Turn the takeup guide arm slightly clockwise and install the tension regulation arm T to the shaft. Secure the arm with a cut washer.
- Fasten the tension regulation spring T and the spring RS to the tension regulation arm T and the lever RS.
- Separate the main brake T and the tension regulation arm T from the takeup reel disk and make certain that the takeup reel disk turns freely.
- Place the reel disk adjusting jig (Part Number 859C342O20) in the reference position on the main plate. (Refer to Fig. 2-10-6.)
- Turn the jig slowly about the point A towards the takeup reel disk to make certain that the height of the disk flange agrees with the point B on the takeup side of the jig(marked TU). (Refer to Fig. 2-11-3.)
- If the height of the disk is not satisfactory, hold the disk so that it shall not turn, and turn the height adjusting screw at the top of the disk to adjust the height. (Refer to Fig. 2-11-3.)
 - Turn the screw clockwise if the measured height is low.
 - Turn the screw counterclockwise if the measured height is high.
- On completion of height adjustment, lock the adjusting screw by burning it with the tip of the hot iron.
- Install the cassette housing as in Para. 2-1-2.



F0D029

2-12 A/C Head

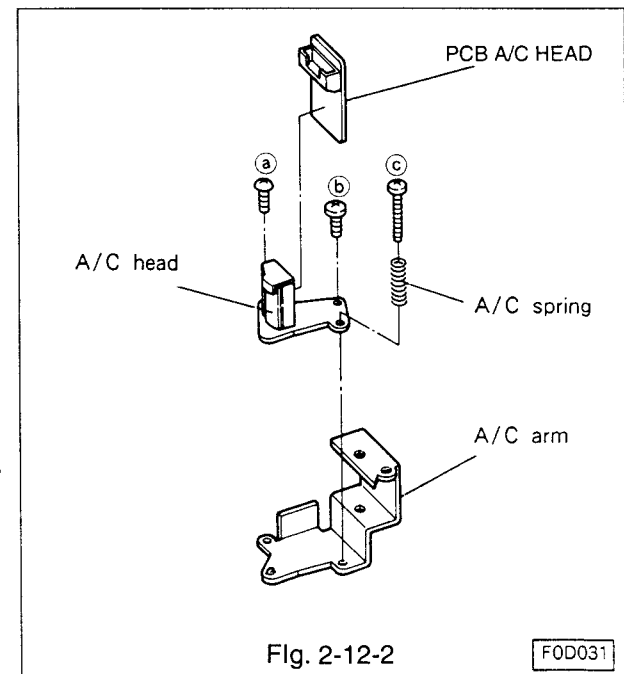
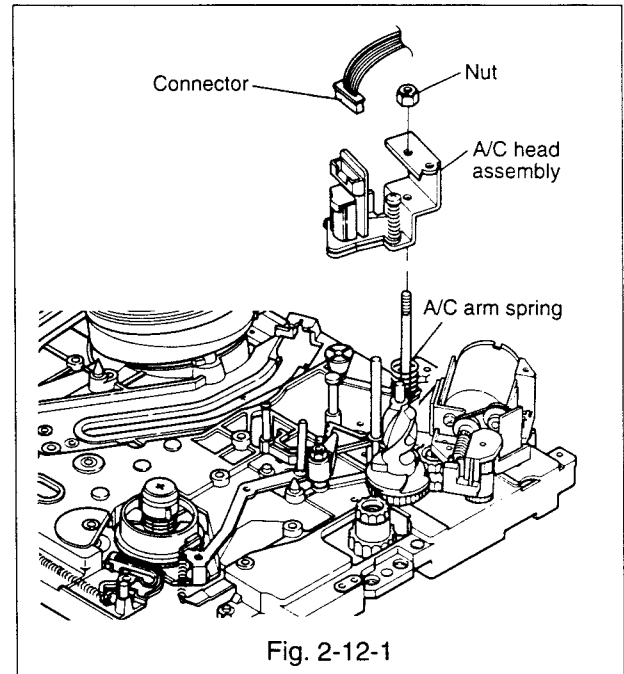
2-12-1 Removal (Refer to Fig. 2-12-1, 2-12-2.)

- Disconnect the connector from the PCB A/C HEAD. (Refer to Fig. 2-12-1.)
- Remove the nut which fastens the A/C head assembly.
- Raise upwards and remove the A/C head assembly from the shaft by paying attention to the A/C arm spring which turns the A/C head assembly clockwise.
- Remove three A/C head fastening screws[(a),(b) and (c)] and the A/C spring shown in Fig. 2-12-2, and remove the A/C head from the A/C arm.
- Unsolder the PCB A/C HEAD from the A/C head. (Refer to Fig. 2-12-2.)

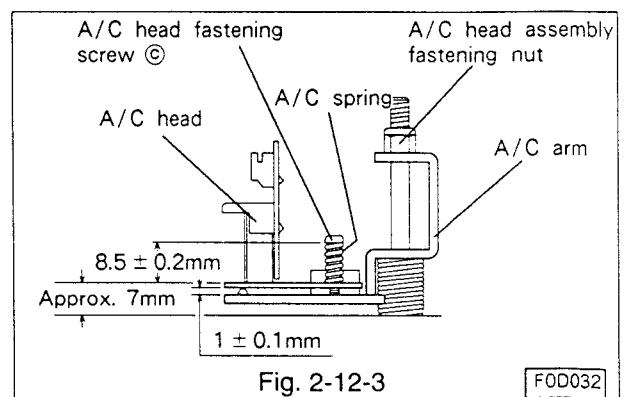
2-12-2 Installation (Refer to Fig. 2-12-1~2-12-3.)

- Solder the PCB A/C HEAD to the A/C head. (Refer to Fig. 2-12-2.)
- Fasten the A/C head to the A/C arm with three screws[(a),(b) and (c)] and the A/C spring.

Note:
Install the A/C head to the A/C arm so that the base surface of the A/C head shall be parallel to the A/C arm, and their spacing and the A/C head installation screw(c) height shall be as specified in Fig. 2-12-3.
- Assemble the A/C head assembly to the shaft while turning the A/C arm spring counter-clockwise about 60° . (Refer to Fig. 2-12-1.)
- Tighten the A/C head assembly fastening nut so that the base surface of the A/C head shall be about 7mm above the main plate surface. (Refer to Fig. 2-12-3.)
- Plug in the connector to the PCB A/C HEAD. (Refer to Fig. 2-12-1.)
- Conduct the A/C head adjustment and the phase adjustment as outlined in Para. 3-3 and 3-4.



F0D031



F0D032

2-13 Take Up Guide Arm

2-13-1 Removal(Refer to Fig. 2-13-1.)

- Set the VCR in the eject mode.
- Remove the pinch roller arm assembly.
(Refer to Para. 2-8 "Pinch Roller")
- Raise and separate the pinch roller cam and the TU-G gear arm from the shaft at the same time.
- Remove the takeup guide arm fastening nut. Raise and separate the takeup guide arm from the shaft with care not to lose the TU-G spring.

2-13-2 Installation(Refer to Fig. 2-13-1~2-13-3.)

- Install the TU-G spring and the takeup guide arm so that one end of the TU-G spring is fastened to the takeup guide arm and the other end is fastened to the hook of the main plate. Secure them with the fastening nut temporarily.
- Place the reel disk adjusting jig(for the F deck) in the reference position on the main plate(Refer to Fig. 2-10-6). Tighten the takeup guide arm fastening nut so that the lower flange of the takeup guide arm is level with point B of the height adjusting jig(for the E deck). (Refer to Fig. 2-13-2.)
- Turn the takeup tension lever fully clockwise as shown in Fig. 2-13-1.
- Line the matching mark on the TU-G gear arm and beginning of gear section on the takeup guide arm, and line the matching mark on the pinch roller cam and center of gear on the joint gear as shown in Fig. 2-13-3, and install the pinch roller cam and the TU-G gear to the shaft at the same time.
- Assemble the pinch roller arm assembly to the shaft on the main plate.(Refer to Fig. 2-13-1.)
- Secure the pinch roller arm assembly with the pinch roller arm cap and the grip ring.

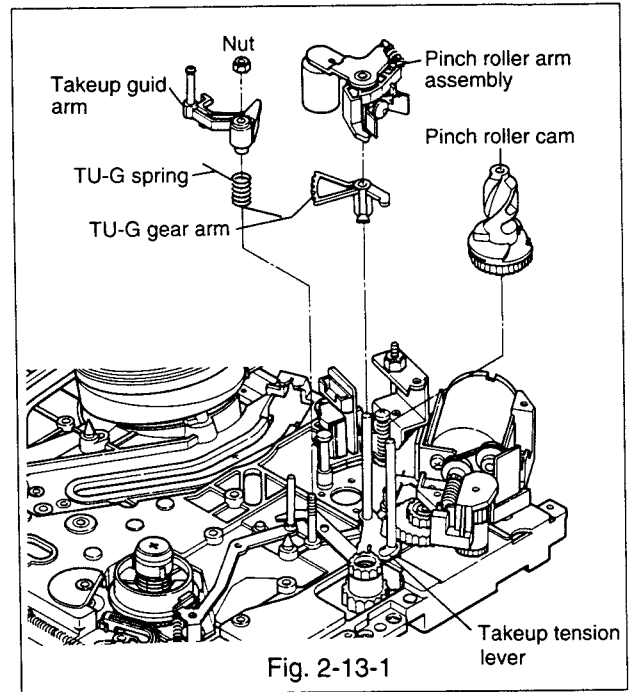


Fig. 2-13-1

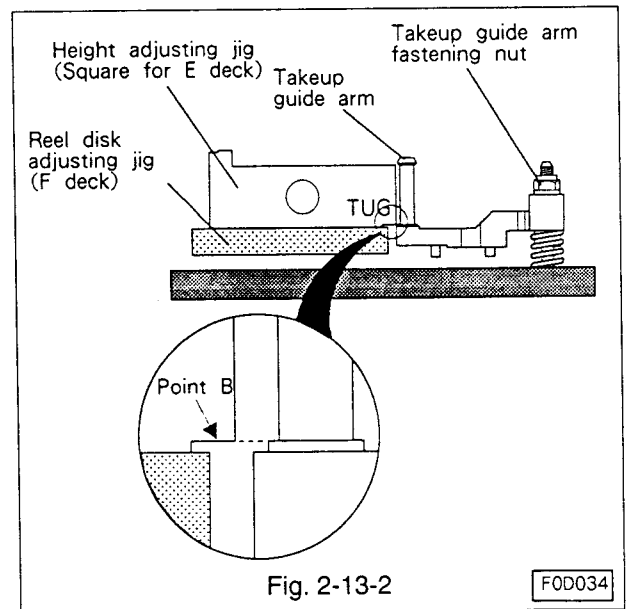


Fig. 2-13-2

F0D034

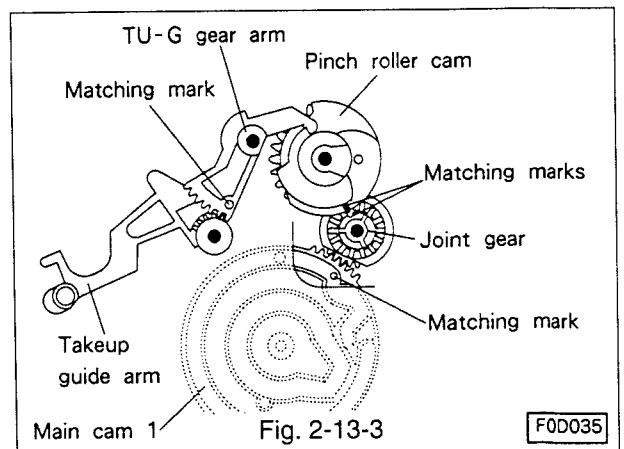


Fig. 2-13-3

F0D035

2-14 PCB Deck(Printed Circuit Board)

2-14-1 Removal(Refer to Fig. 2-14-1, 2-14-2.)

- Detach the capstan brake spring from the capstan brake and the loading gear arm.(Refer to Fig. 2-14-1.)
- Remove the reel belt from the bottom of the deck.(Refer to Fig. 2-5.)
- Detach two grip rings(f) shown in Fig. 2-14-2 and remove the loading gear arm.
- Unsolder the terminals of the FE head.(Refer to Fig. 2-14-1.)
- Unfasten the catches and remove the F/L gear 2, 3 and 4.(Refer to Fig. 2-14-2.)
- Remove grip ring(g) and cut washer(h), and unfasten three catches shown in Fig. 2-14-3 to remove the cam plate B.(Refer to Fig. 2-14-2.)
- Unscrew five fastening screws[(a) to (e)] and remove the PCB DECK.(Refer to Fig. 2-14-2.)

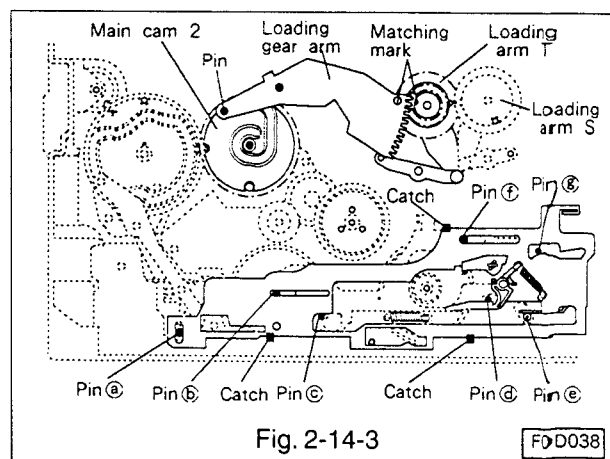
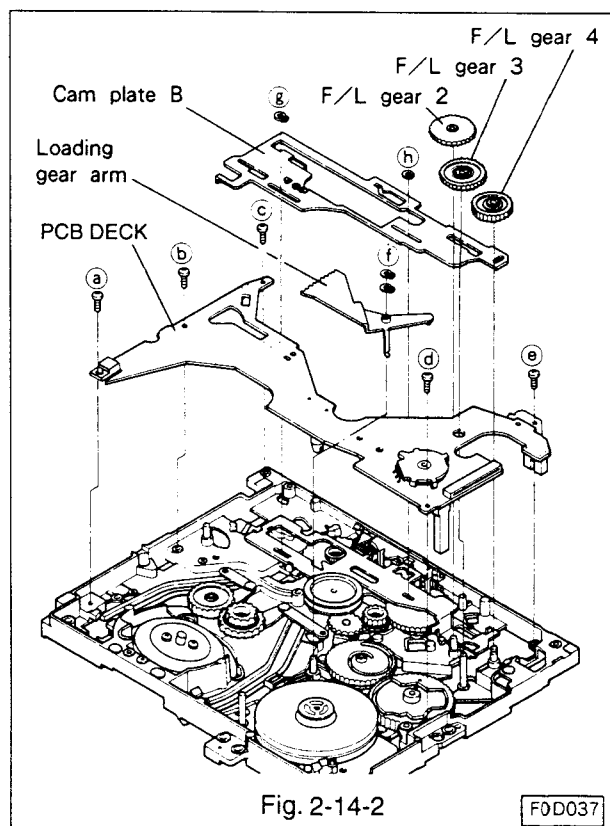
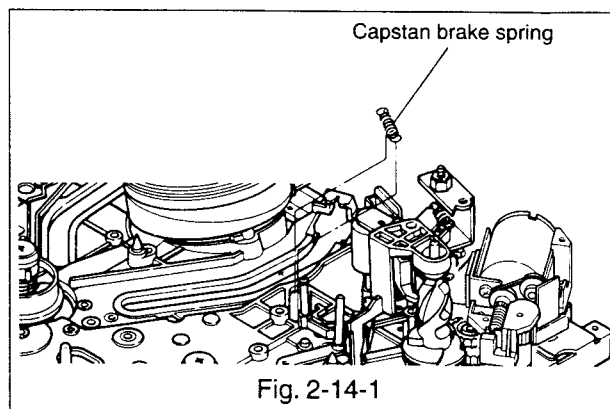
2-14-2 Installation(Refer to Fig. 2-14-1~2-14-3.)

- Make certain that the mode switch is set to the eject position.(Refer to section 2-9.) Fasten the PCB DECK with five screws and solder the FE head terminals.(Refer to Fig. 2-14-1.)

Note:

The safety lever is normally held leftward with a spring. Pull the safety lever forwards and install the PCB DECK.

- Install the cam plate B by paying attention to the pin[(a) to (g)] positions shown in Fig. 2-14-3, and secure the plate with three catches, grip ring(g) and cut washer(h).
- Line the matching mark on the loading arm T and that on the loading gear arm as shown in Fig. 2-14-3, and assemble the loading gear arm so that the pin of the loading gear arm shall enter the groove of the main cam 2. Secure the loading gear arm with two grip rings(f).
- Assemble the F/L gear 2, 3, and 4 to the shafts.(Refer to Fig. 2-14-2.)
- Install the reel belt.(Refer to Fig. 2-5.)
- Fasten the capstan brake spring to the capstan brake and the loading gear arm from the top side of the deck.(Refer to Fig. 2-14-1.)



2-15 Positioning and Installation Sequence of Parts Around Main Cam 1 (Bottom Side of Deck) (Refer to Fig. 2-15-1~2-15-6.)

Note:

Set the VCR to the eject mode to install the main cam 1 and its peripheral parts.

- A. Line the positioning hole in the lever RS and that of the main plate, and assemble the lever RS to the shaft. (Refer to Fig. 2-15-1.)
- B. Line the positioning hole in the lever C with that of the main plate, and assemble the lever C to the shaft.
- C. With care not to move the lever RS and lever C, assemble the main cam 1 to the shaft by lining the matching mark of the joint gear with the positioning hole of main plate. Secure the main cam 1 with the grip ring. (Refer to Fig. 2-15-2.)

Note:

The pins of the lever RS and the lever C enter the groove of the main cam 1 when the levers are lined with the positioning holes.

Make certain that the pins of the levers enter the groove of the main cam 1.

- D. Assemble the thrust washer to the pin(c) shown in Fig. 2-15-2, and install the cam plate C so that the corresponding positions of the plate shall match the pins[(a) to (g)].
- E. Fasten the cam spring C to the cam plate C and the cam plate holder. (Refer to Fig. 2-15-2.)
- F. Assemble the lever B to the shaft so that the pin of the lever shown in Fig. 2-15-3 shall enter the groove of the main cam 1. Secure the lever with a grip ring.
- G. Line the positioning hole of the F/L idler lever with that of the main plate. (Refer to Fig. 2-15-3.)

Note:

The pin of the F/L idler lever enters the groove of the main cam 2 when the positioning hole of the F/L idler lever is lined.

Make certain that the pin of the lever enters the groove of the main cam 2.

- H. Line the matching mark of the main cam 2 with that of the main cam 1, and also the positioning hole of the main cam 2, and assemble the main cam 2 to the shaft. (Refer to Fig. 2-15-3.)

Note:

Make certain that the pin of the F/L idler lever correctly enters in the groove of the main cam 2.

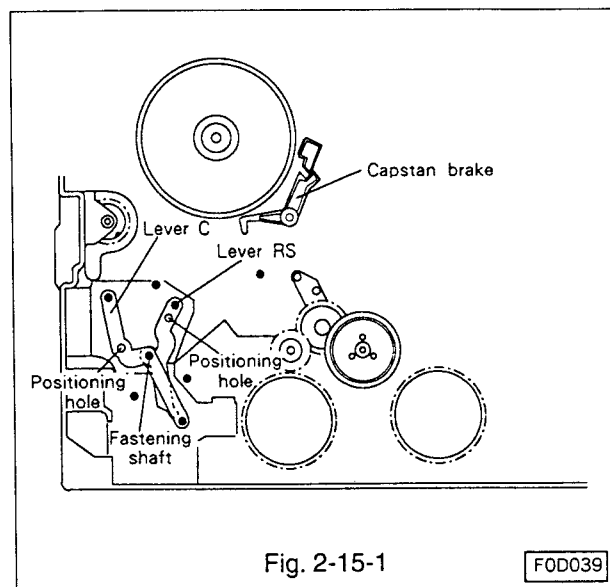


Fig. 2-15-1

F0D039

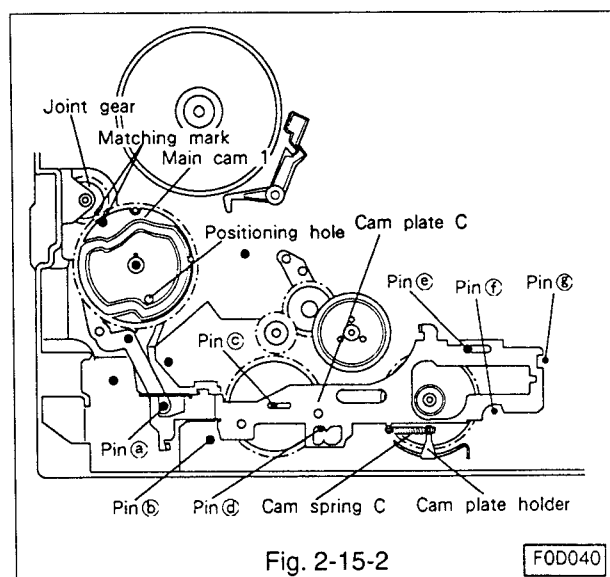


Fig. 2-15-2

F0D040

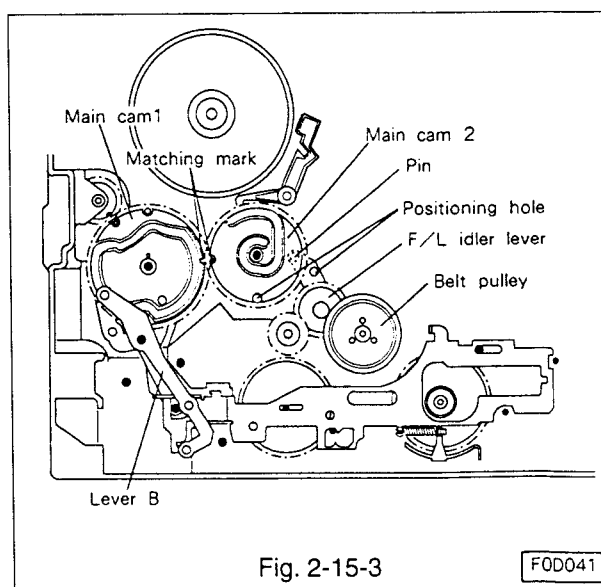


Fig. 2-15-3

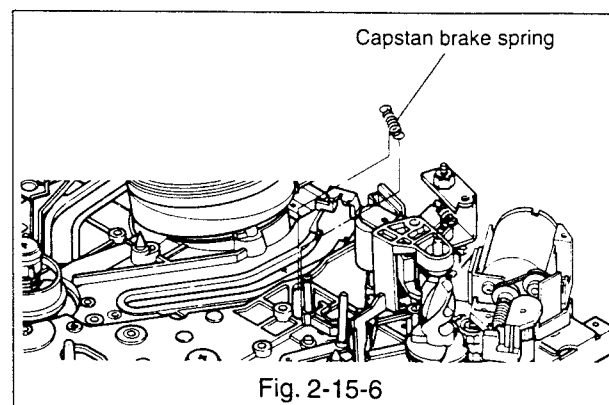
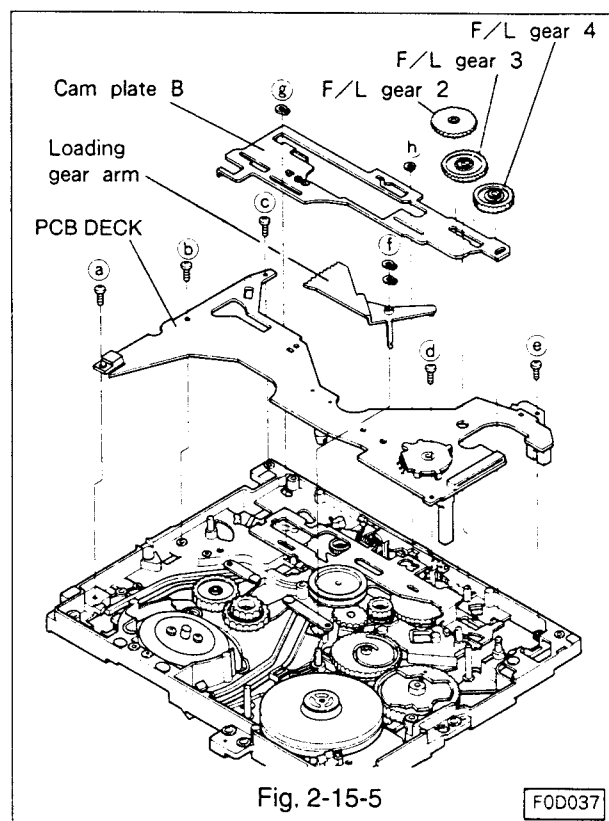
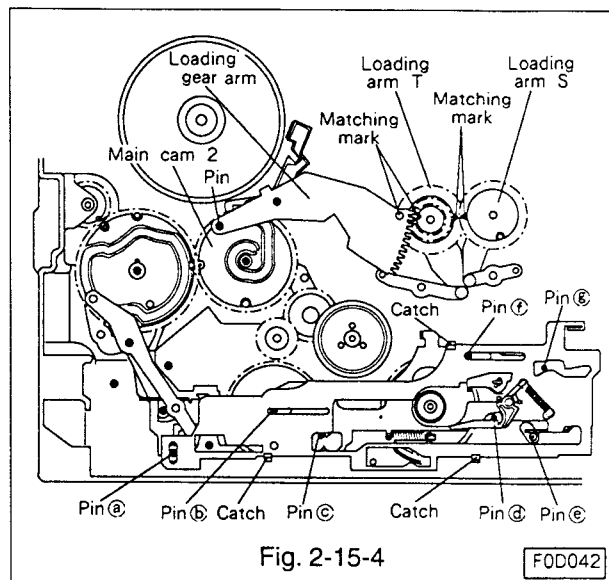
F0D041

- I. Make certain that the mode switch is in the eject position. Fasten the PCB DECK assembly with five screws and solder the FE head terminals. (Refer to Fig. 2-14-2 and 2-14-1.)

Note:

The safety lever is normally held in the leftward position by the spring. Pull the lever forwards and install the PCB DECK assembly.

- J. Install the cam plate B so that the plate shall match the pins(a) to (g) as shown in Fig. 2-15-4, especially the pin(e), and secure the plate with three clamps, cut washer[pin (b)] and grip ring[pin(f)].
- K. Line the matching mark of the loading arm T with that of the loading gear arm as shown in Fig. 2-15-4, and assemble the loading gear arm to the shaft so that the pin of the loading gear arm shall enter the groove of the main cam 2. Secure the arm with two grip rings(f). (Refer to Fig. 2-15-5.)
- L. Assemble the F/L gear 2, 3, and 4 to the shafts as shown in Fig. 2-15-5.
- M. Install the reel belt. (Refer to Fig. 2-5.)
- N. Fasten the tension regulation spring T and the spring RS to the tension regulation arm T and the lever RS from the top side of the deck. (Refer to Fig. 2-11-1.)
- O. Fasten the capstan brake spring to the capstan brake and the loading gear arm from the top side of the deck. (Refer to Fig. 2-15-6.)



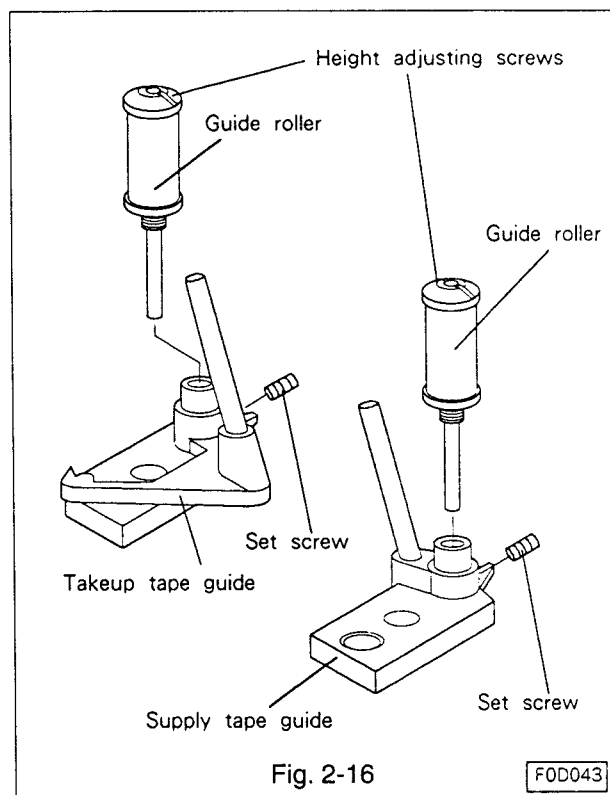
2-16 Supply and Takeup Guide Rollers

2-16-1 Removal(Refer to Fig. 2-16.)

- A. Remove the cassette housing as in Para. 2-1-1.
- B. Loosen the set screw to such a degree as the guide roller turns lightly.
- C. Loosen the guide roller height adjusting screw located at the top of the guide roller by turning counterclockwise with the height adjusting screwdriver. Raise and remove the roller from the tape guide.

2-16-2 Installation(Refer to Fig. 2-16.)

- A. Make certain that the fastening thread section of a new guide roller is provided with a rubber ring.
- B. Set the new guide roller in the tape guide fastening hole.
- C. Turn the guide roller slowly clockwise till it becomes heavy.
- D. Turn further about 1/6 turns from a point where the guide roller becomes heavy, and return the roller about one turn counter-clockwise.
- E. Again turn the guide roller slowly clockwise till it becomes heavy. Turn the roller further about 1/6 turn from the point where the roller becomes heavy.
- F. Secure the guide roller lightly with the set screw. Check and adjust the envelope as in Para. 3-2.



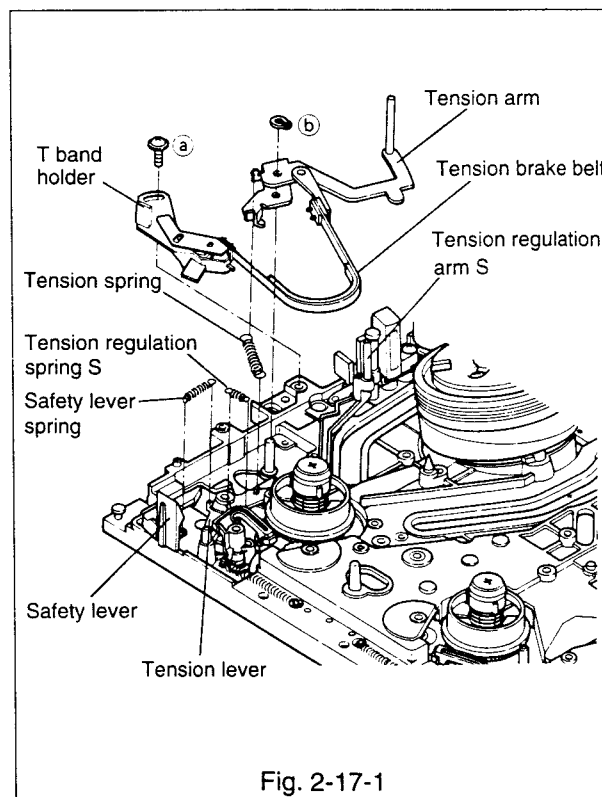
2-17 Supply and Takeup Tape Guide Assemblies

Note:

Refer to section 3-2-7 and 3-3-3 before replacing the supply or takeup tape guide assemblies.

2-17-1 Removal(Refer to Fig. 2-17-1~2-17-4.)

- A. Remove the cassette housing as in Para. 2-1-1.
- B. Detach the capstan brake spring from the capstan brake and the loading gear arm.(Refer to Fig. 2-15-6.)
- C. Remove the reel belt. (Refer to Fig. 2-5.)
- D. Secure the tension arm and the tension regulation arm S with a rubber band etc. so as to separate them from the supply guide roller.(Refer to Fig. 2-17-1.)



- E. Remove the grip ring and remove the loading gear arm.(Refer to Fig. 2-17-2.)
- F. Turn the loading arm S and T to the loading position.(Refer to Fig. 2-17-2.)
- G. Unfasten the clamp shown in Fig. 2-17-3, and remove the loading arm S.
- H. Remove the loading arm T further in case of replacing the takeup guide assembly.
- I. Unfasten the clamp of the slider which secures the supply or takeup tape guide assembly, and remove the tape guide assembly and the slider from the main plate.(Refer to Fig. 2-17-4.)

2-17-2 Installation(Refer to Fig. 2-17-1~2-17-4.)

- A. Place a new tape guide assembly on the installation rail of the main plate and install the slider on the reverse side of the main plate so that the catch of the slider enters the fastening hole of the tape guide assembly.
- B. If the takeup tape guide is replaced, install the loading arm T at first.(Refer to Fig. 2-17-2.)
- C. Install the loading arm T so that the matching mark of the loading arm S is lined with the matching mark of the loading arm T as illustrated in Fig. 2-17-2.
- D. Line the matching mark of the loading gear arm with that of the loading arm T, and assemble the loading gear arm to the shaft so that the pin of the loading gear arm enters the groove of the main cam 2. Secure the loading gear arm with two grip rings.
- E. Install the reel belt.(Refer to Fig. 2-5.)
- F. Fasten the capstan brake spring to the capstan brake and the loading gear arm from the top side of the deck.(Refer to Fig. 2-17-1.)
- G. Install the cassette housing as in Para. 2-1-2.

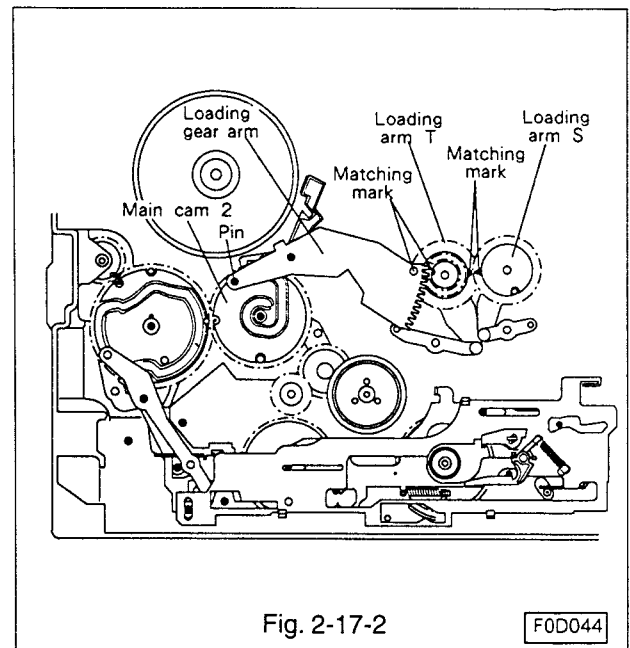


Fig. 2-17-2

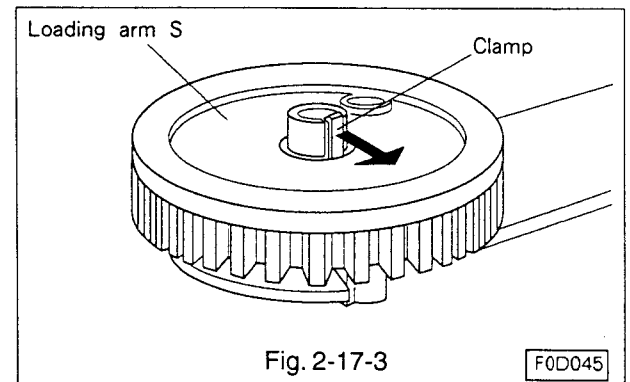


Fig. 2-17-3

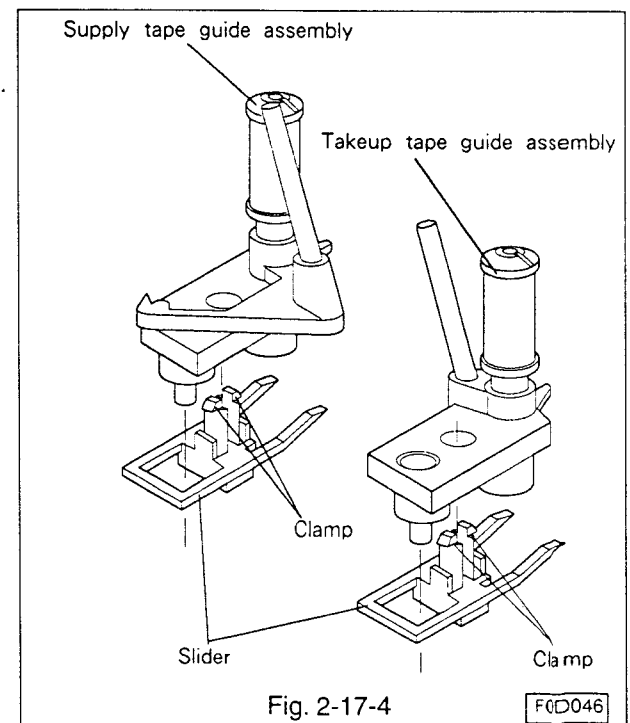


Fig. 2-17-4

3. Interchangeability Adjustment of Mechanism

Note:

Tracking may need to be preset in the inter-changeability adjustment of the mechanism.

Digital tracking should be preset. To preset, short circuit TP8X and TP8Y on the PCB TIMER.

Note:

The adjustment is conducted in the playback mode, using the stair step signal of the alignment tape, connect an oscilloscope to TP2A and external Trig. to TP2H, unless other-wise specified.

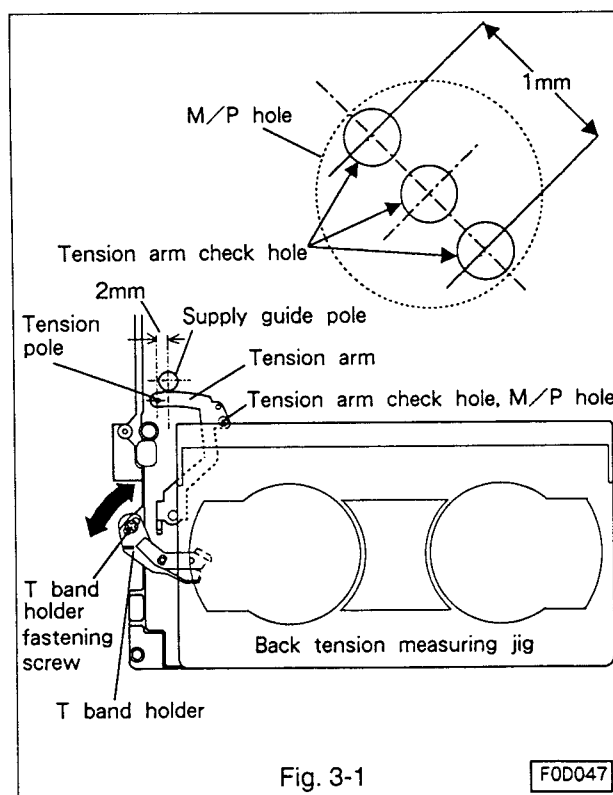
3-1 Adjustment of Back Tension and Tension Pole Position(Refer to Fig. 3-1.)

Run a blank tape for several minutes to break in the reel disks and the transport before beginning the adjustment.

- A. Set the back tension measuring jig and set the VCR to the playback mode.
- B. When the running of the tape becomes steady, make certain that the tension arm check hole is within the M/P hole of the main plate($0 \pm 0.5\text{mm}$) or the interval between the center of tension pole and the center of Supply guide pole is $2.0 \pm 0.5\text{mm}$.
- C. If neither the center of Tension pole nor the tension arm check hole is in position, loosen the T band holder fastening screw lightly and move the T band holder so that the condition specified by the para.B is satisfied.
- D. On completion of adjustment, tighten the T band fastening screw.
- E. Make certain that the reading of the back tension measuring jig is $50 \pm 6\text{g-cm}$.
- F. When the running of the tape is steady, check visually to make certain that the deflection of the Tension pole is 1mm or less.

Note:

Slight fluctuation of back tension may be tolerated, however if fluctuation exceeds 5g-cm, the reel disk etc. may be defective. Examine and correct the defect.



3-2 Check and Adjustment of FM Envelope

3-2-1 Guide Roller Adjustment(Refer to Fig. 3-2-1.)

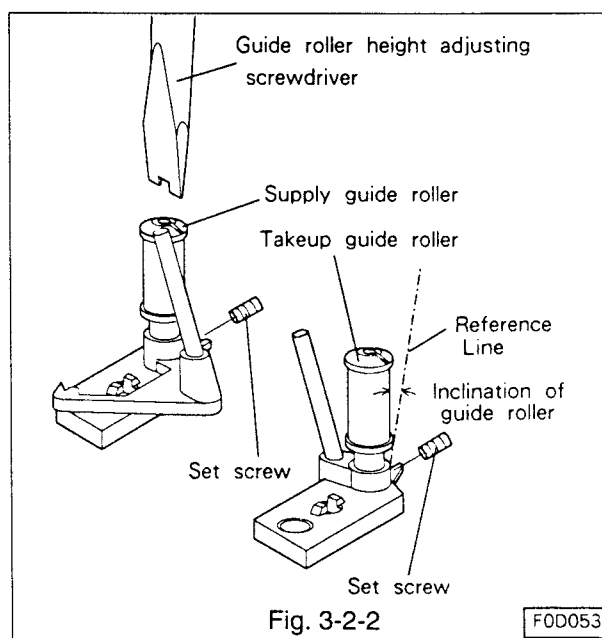
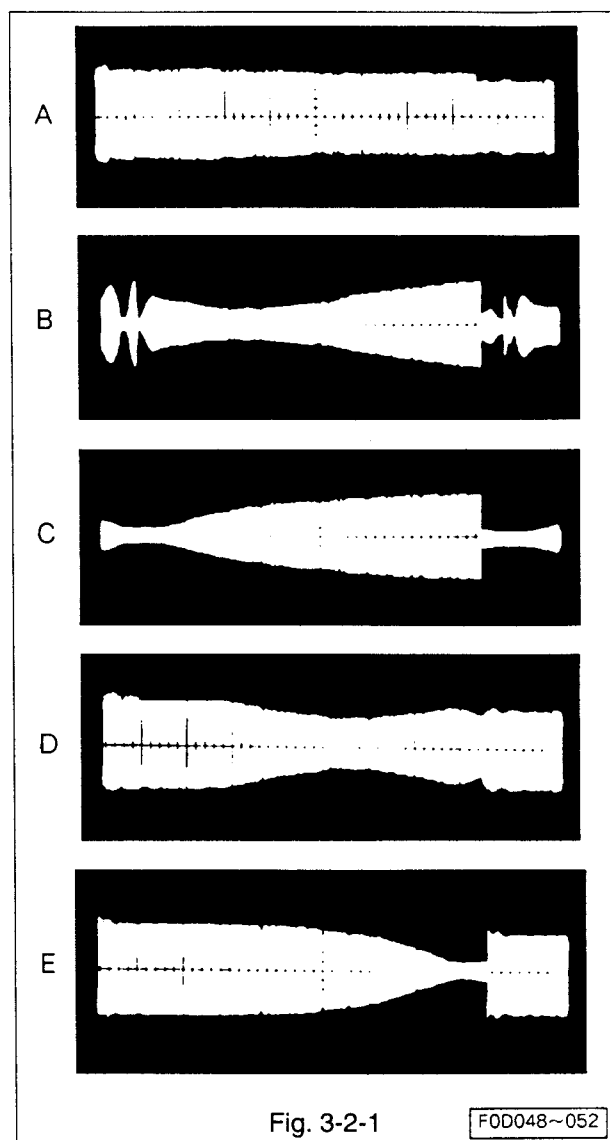
- A. Set the VCR to the playback mode.
B. Preset tracking.
C. Check if the FM waveform is flat like A shown in Fig. 3-2-1.
D. Adjust the height of the supply guide roller as in 3-2-2 if the leading portion (the entry side of the drum) of the FM waveform is not flat like B or C.
Adjust the height of the takeup guide roller as in 3-2-3 if the trailing portion (the exit side of the drum) is not flat like D or E.

3-2-2 Adjustment of Supply Guide Roller Height (Refer to Fig. 3-2-1, 3-2-2.)

- A. Loosen the set screw to such a degree as the supply guide roller turns lightly.(Refer to Fig. 3-2-2.)
B. The supply guide roller is low if the leading portion(the entry side of the drum) of the FM waveform is like B, and high if like C. Adjust the height of the roller by turning the adjusting screw at the top of the roller so that the FM waveform shall be flat like A.
• Turn the adjusting screw counterclockwise if the roller is low.
• Turn the adjusting screw clockwise if the roller is high.
C. Carry out the coarse adjustment of phase as in 3-2-4.

3-2-3 Adjustment of Takeup Guide Roller Height (Refer to Fig. 3-2-1, 3-2-2.)

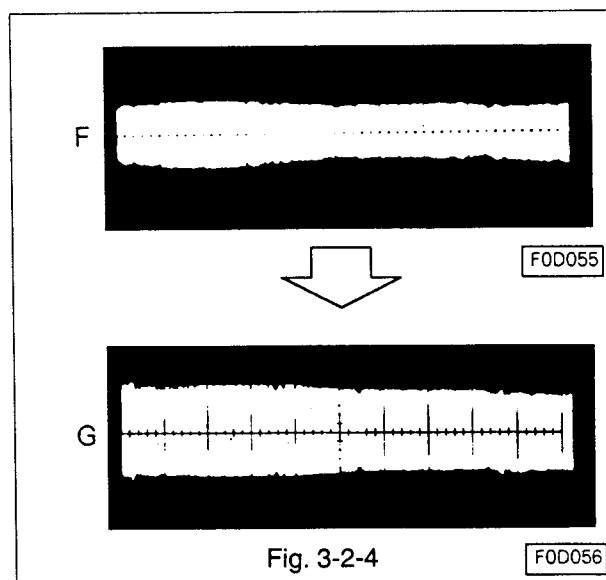
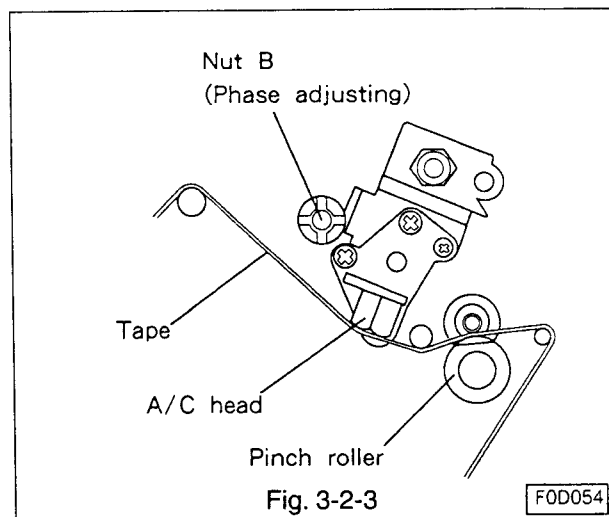
- A. Loosen the set screw to such a degree as the takeup guide roller turns lightly.(Refer to Fig. 3-2-2.)
B. The takeup guide roller is low if the trailing portion(the exit side of the drum) of the FM waveform is like D, and high if like E. Adjust the height of the roller by turning the adjusting screw at the top of the roller so that the FM waveform shall be flat like A.
• Turn the adjusting screw counterclockwise if the roller is low.
• Turn the adjusting screw clockwise if the roller is high.
C. On completion of height adjustment, adjust the azimuth and height of the A/C head as in 3-3-2.
D. Coarsely adjust the phase as in 3-2-4.



3-2-4 Coarse Phase Adjustment

(Refer to Fig. 3-2-3, 3-2-4.)

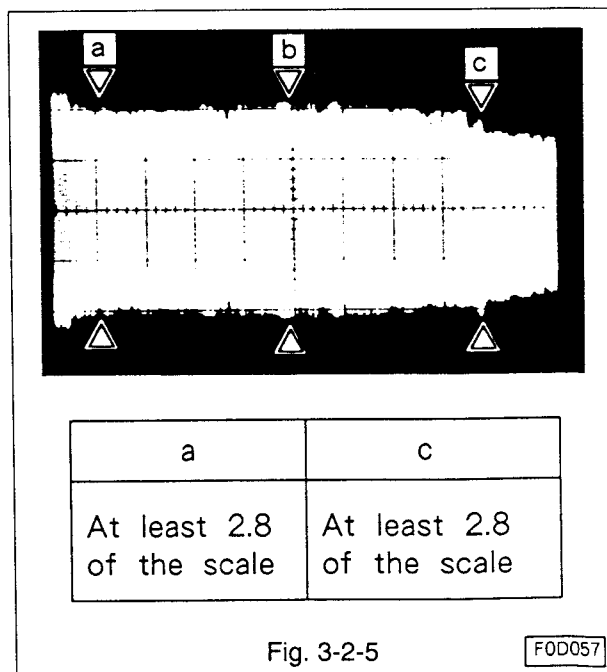
- Set the VCR to the playback mode.
- Preset tracking.
- Check the FM waveform after checking and adjusting the guide rollers.
- If the amplitude of the FM waveform is narrow like F because of out of phase, adjust the phase adjusting nut so that the amplitude of the FM waveform shall be maximum.



3-2-5 Check of FM Waveform Flatness

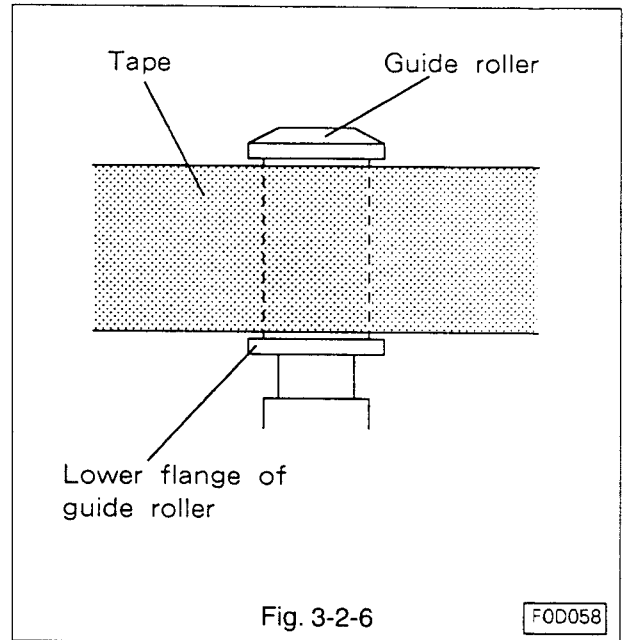
(Refer to Fig. 3-2-5.)

- Set the VCR to the playback mode.
- Set the tracking switch to the manual mode. Vary tracking and check if the amplitude changes while the waveform remains flat.
- Adjust tracking in the manual mode so that the amplitude shall be maximum, and adjust the oscilloscope so that the amplitude shall be '5' on the scale of the oscilloscope.
- Adjust tracking so that the amplitude at the middle (around the point 'b') of the FM waveform is about 80% ('4' on the scale of the scope) of the maximum amplitude. Make certain that the amplitudes around the points 'a' and 'c' satisfy the requirements given in Fig. 3-2-5.
- If deviating from the requirements, conduct the check and adjustment of the FM envelope as in 3-2 from beginning.



3-2-6 Check 1: Tape Running Condition on Guide Rollers(Refer to Fig. 3-2-6.)

- Set the VCR to the playback mode.
 - Visually check if there is a space between the tape and the lower flange of the supply and the take up guide roller.
 - If not, replace the tape guide as in 3-2-7.
- Note:**
In this case the tape guide should be replaced with the tape guide which has a larger inclination.
- If the supply tape guide is replaced, check the guide roller as in 3-2-1.
If the take up tape guide is replaced, check the guide roller as in 3-2-3, and the waveform flatness as in 3-2-5
 - Load and unload the tape several times to make certain that the flatness of the FM waveform dose not change.
 - If changes occur, check the A/C arm shaft for looseness.
If not free, replace the A/C arm and adjust the audio/control head as in 3-3.

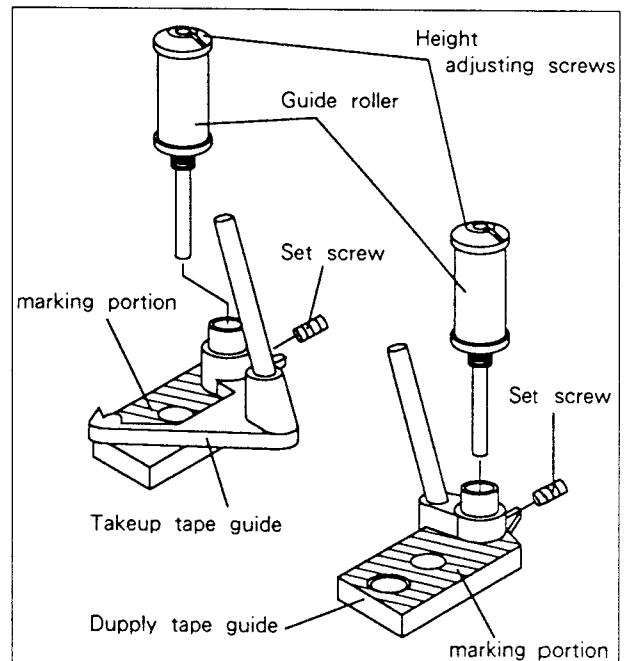


3-2-7 Replacement of Tape Guides

- Identify the Item Number of the tape guide to be rplaced. This is done by observing the marking present on the die-cast portion of the tape guide base, and comparing that marking to Fig. 3-2-7.
- If the Item Number of the tape guide presently installed is a '2', replace the guide with an Item Number '1' guide.(Part No.635B059O10)
- If the Item Number of the present tape guide is a '1', replace the guide with an Item Number '3' guide.
- If the Item Number of the present tape guide is a '3', replace the guide with other Item Number '3' guide.
- Once the tape guide is replaced, resume alignment starting with 3-2-1.

3-2-8 Check 2: Tape Running Condition on Guide Rollers

- Set the VCR to the playback mode.
- Press the head of the supply guide roller and the take up guide roller lightly, and release the roller. Check if the FM waveform is quickly restored to the previous level.
- If the FM waveform is not restored quickly, replace the tape guide as in 3-2-7.
- If the supply tape guide is replaced, check the guide roller as in 3-2-1.
If the takeup tape guide is replaced, check the guide roller as in 3-2-1, and check the FM waveform as flatness as in 3-2-5
- If satisfactory, tighten the set screw of the guide roller on the supply side and the take up side.



Identification of Tape Guide Item Number
(Example ; Parts No. 635B059O10)

Item No.

Item No.1	No marking
Item No.2	Marked with black magic marker
Item No.3	Marked with red magic marker

※The marking point is marked in oblique line portion shown in figure above.

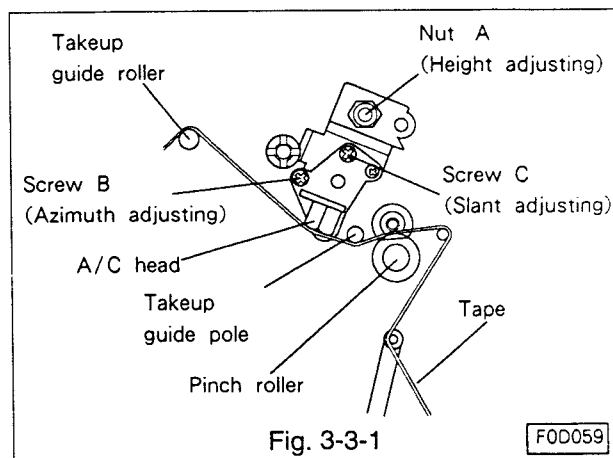
Fig. 3-2-7

3-3 Adjustment of Audio/Control Head

3-3-1 Adjustment of A/C Head Slant

(Refer to Fig. 3-3-1.)

- Play back a blank tape.
- Turn the screw C slowly clockwise to crease the bottom edge of the tape slightly by the lower flange of the takeup guide pole.
- Turn the screw C slowly counterclockwise to eliminate the crease of the bottom edge of the tape.
- Turn the screw C slowly clockwise again and stop turning just before the tape is creased.



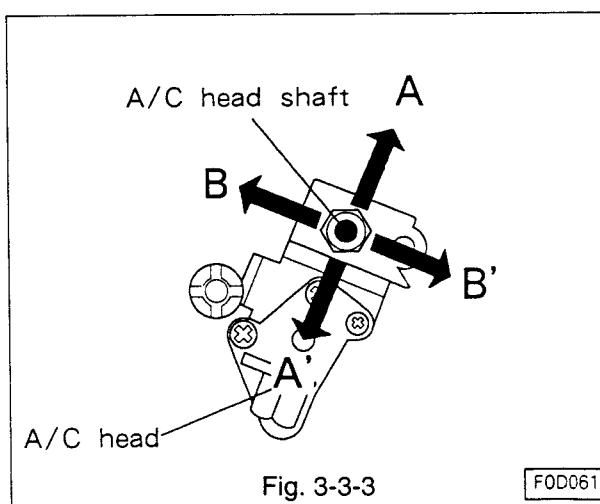
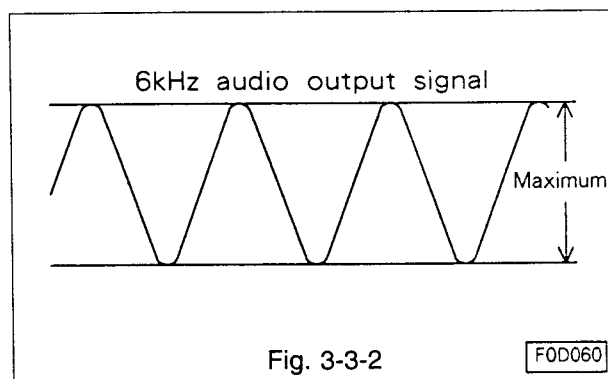
3-3-2 Adjustment of A/C Head Azimuth and Height(Refer to Fig. 3-3-1~3-3-3.)

- Using stair step signal of alignment tape, connect an oscilloscope to the audio output terminal and set the VCR to the playback mode.
- Turn the nut A (height adjusting) and the screw B (azimuth adjusting) so that the audio output level shall be maximum.
- Turn the A/C head counterclockwise and release it to make certain that the audio output level does not change.
- If the level changes, check if the A/C arm shaft is loose. If not free, replace the A/C arm and adjust the slant of the A/C head as in 3-3-1 and the azimuth and height of the A/C head from beginning.
- Apply a force lightly to the A/C head shaft in the direction of A and A' of the arrow shown in Fig. 3-3-3 to make certain that the audio output level remains at maximum level and does not change.
- If the level changes, turn the nut A (height adjusting) so that the audio output level shall be maximum. Apply a force lightly to the A/C head shaft in the direction of B and B' of the arrow shown in Fig. 3-3-3 and adjust so that the sound output level shall be maximum.
- Check the sound output level in the playback mode to make sure that the fluctuation of the level is less than 2dBp-p.
- If the fluctuation exceeds 2dBp-p, adjust the slant of the A/C head and the azimuth and height of the head.
- If this is still not satisfactory, replace the takeup tape guide as outlined in 3-3-3.

Note:

In this case the tape guide should be replaced with a guide which has less inclination.

- On completion of the above adjustment, adjust phase as in 3-4.



Identification of Tape Guide Item Number
(Example ; Parts No. 635B060010)

Item No. 1

Item No.1	No marking
Item No.2	Marked with black magic marker
Item No.3	Marked with red magic marker

※The marking points are marked in the tops of the Takeup and Supply tape guides.(Refer to Fig. 3-2-7)

Fig.3-3-4

3-3-3 Replacement of Tape Guides

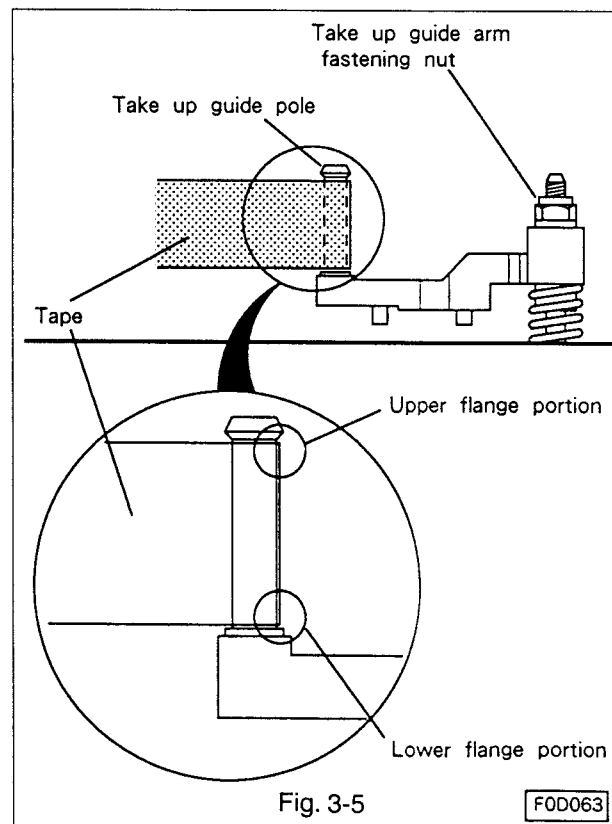
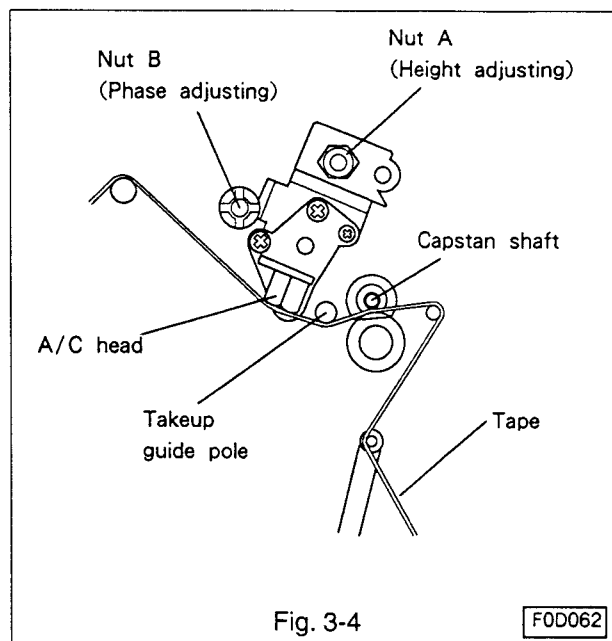
- A. Identify the Item Number of the Tape Guide to be replaced. This is done by observing the marking present on the die-cast portion of the Tape Guide base, and comparing that marking to Fig. 3-3-4.
- B. If the Item Number of the tape guide presently installed is a '3', replace the guide with an Item Number '1' guide.
- C. If the Item Number of the present tape guide is a '1', replace the guide with an Item Number '2' guide.
- D. If the Item Number of the present tape guide is a '2', replace the guide with other Item Number '2' guide.
- E. Once the tape guide is replaced, resume alignment starting with 3-2-1.

3-4 Phase Adjustment(Refer to Fig. 3-4.)

- A. Set the VCR to the playback mode.
- B. Preset tracking.
- C. Turn the phase adjusting nuts to make the amplitude of the FM waveform maximum.
Note:
Do not turn the phase adjusting nut exceeding one turn in either direction.
- D. Turn the A/C head counterclockwise and return to make sure that the amplitude of the FM waveform is the same as that before turning the head.
- E. If the amplitude changes, check the A/C arm shaft if loose. If not free, replace the A/C arm and adjust the A/C head as in 3-3 and the phase as in this section from beginning.
- F. Load and unload the tape several times to make certain that the amplitude of the FM waveform does not change.

3-5 Adjustment of Takeup Guide Arm Height (Refer to Fig. 3-5.)

- A. Run a final portion of E-240 blank tape in the reverse search mode.
- B. Adjust the height of the takeup guide pole by turning the height adjusting nut so that the tape shall not be creased at the upper and the lower flange portion of the take up guide pole.
Note:
Set the adjusting nut in the screwing-in direction.
Do not turn the nut exceeding one turn in either direction.
- C. Eject the cassette tape and set to the reverse search mode again to make certain that the tape is not creased at the upper and the lower flange portion of the takeup guide pole.
- D. Set to the playback mode and be sure that the tape is not creased at the upper and the lower flange portion of the takeup guide pole.

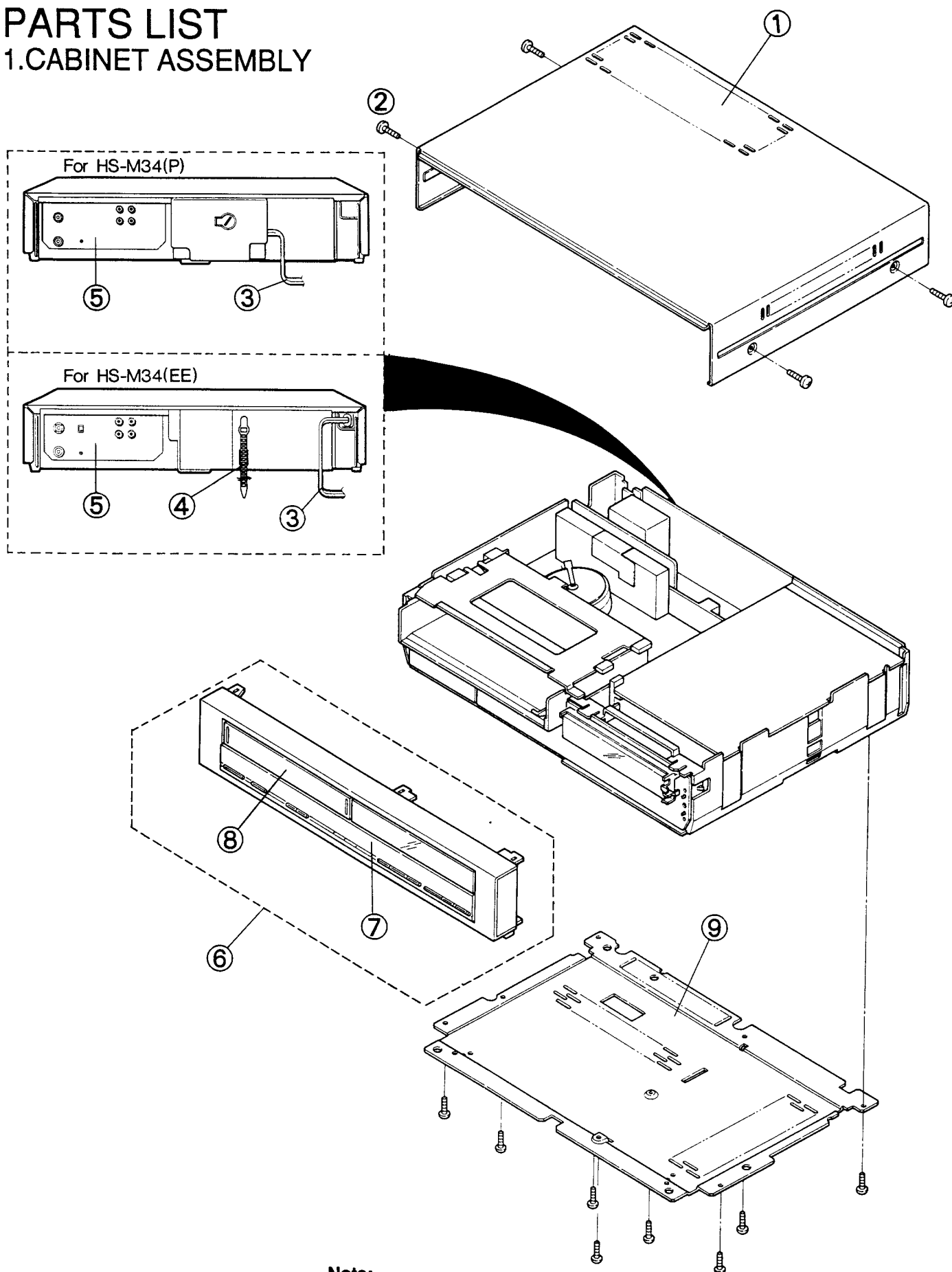


KEY TO ABBREVIATIONS

A/C	: Audio/Control	LIM	: Limiter
ACC	: Automatic Colour Control	LPF	: Low-Pass Filter
A.E	: Audio Erase	LM	: Loading Motor
AFC	: Automatic Frequency Control		
AFT-D	: Automatic Fine Tuning Door Switch	MDA	: Motor Drive Amplifier
AGC	: Automatic Gain Control	MC	: Mechanical Control
AL	: After Loading	MIC	: Microphone
AMP	: Amplifier	MOD	: Modulator
ANT	: Antenna		
A-PB	: Audio-Playback	OPE	: Operation
A-REC	: Audio-Recording	OSC	: Oscillator
ALC	: Automatic Level Control		
		PB	: Play Back
BPF	: Band-Pass Filter	PG	: Pulse Generator
B/W	: Black and White	P/R-SW	: P.B/REC-Switch
BS	: Band Switch	PCB	: Printed Circuit Board
		PIC	: Picture Control
CASS	: Cassette		
CP	: Capstan	REC	: Recording
CP-FG	: Capstan-Frequency Generator	REF	: Reference
CP-F/R	: Capstan-Forward/Reverse	RIS	: Record Inhibit Switch
CP-M	: Capstan-Motor	REW	: Rewind
CONV	: Converter	REG	: Regulator
CTL	: Control	RS	: Reverse Search
C-LAMP	: Cassette Lamp		
C-I LAMP	: Cassette Indicator Lamp	SENS	: Sensor
		SM	: Supply Motor
DAL	: Delay-After Loading	S/P	: Still/Pause
DEMOD	: Demodulator	SS	: Speed Search
DET	: Detector	STBY	: Stand By
DL	: Delay Line	S & H	: Sample & Hold
DL-REV	: Delay Reverse	SYNC SEP	: Sync Separator
DL-FWD	: Delay Forward		
DOC	: Drop Out Compensator	TM	: Take up Motor
		T-REC	: Timer-Recording
EF	: Emitter Follower	T.P	: Test Point
EMPHA	: Emphasis	TR	: Transistor
EQ	: Equalizer	TU-P	: Tuner-Power
EE	: Electronic-Electronic		
ES	: End Sensor	UL	: Unloading
FE-H	: Full Erase Head	VS	: Voltage Synthesizer
FF	: Flip Flop or Fast Forward	V.SYNC	: Vertical Sync
FG	: Frequency generator	VCO	: Voltage Controlled Oscillator
FL-SW	: Front Loading Switch	VXO	: Variable Crystal Oscillator
FLM	: Front Loading Motor		
F/R-SW	: FF/Rewind Switch	W/D	: White/Dark
G	: Ground	X'OSC	: Crystal Oscillator
HE-1	: Hall Element-1	Y/C	: Luminance/Chrominance
HE-2	: Hall Element-2		
H-LED	: Humidity-LED		
H-SENS	: Humidity-Sensor		
HPF	: High-Pass Filter		

PARTS LIST

1.CABINET ASSEMBLY

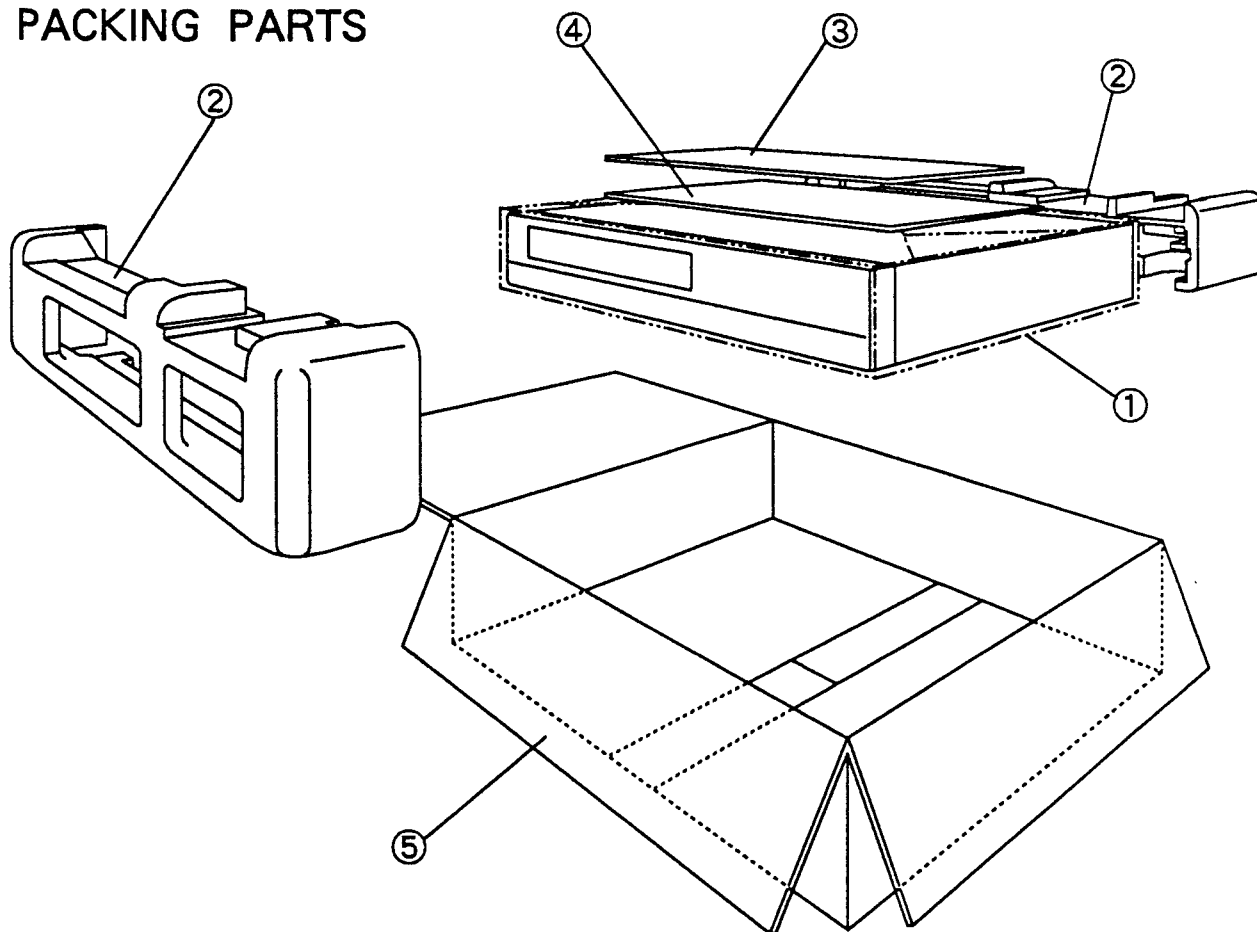


Note:

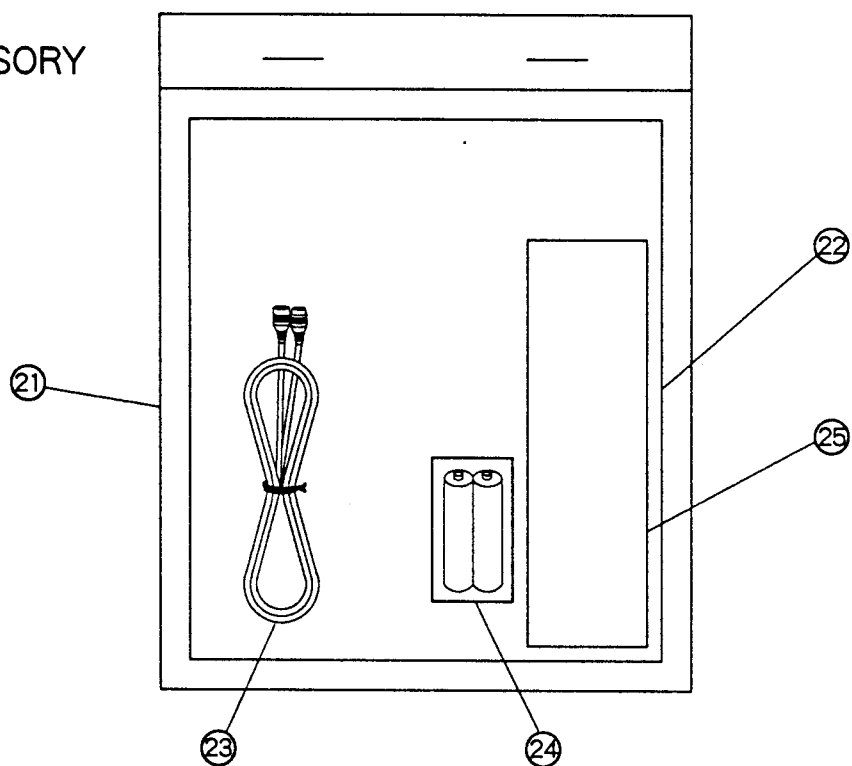
Broken AC power cord must be exchanged with a new original power cord.

ITEM NO.	PARTS NO.	PARTS NAME	DESCRIPTION
CABINET ASSEMBLY			
1	968C020040	TOP COVER ASSY	
2	669D223080	SCREW	(10P)
3	246C101010	AC POWER CORD	[EE]
3	246C101080	AC POWER CORD	[P]
4	621C027010	CORD BAND	[EE]
5	761B209020	ANTENNA COVER	[EE]
5	761B170020	ANTENNA COVER	[P]
6	701B226080	FRONT UNIT	[EE]
6	701B226020	FRONT UNIT	[P]
7	712B236080	ORNAMENT FRONT	[EE]
7	712B236020	ORNAMENT FRONT	[P]
8	702B779080	CASSETTE DOOR	
9	590A267010	BOTTOM PANEL	

2. PACKING PARTS



ACCESSORY



ITEM NO.	PARTS NO.	PARTS NAME	DESCRIPTION
PACKING PARTS			
1	831D190030	PACKING SHEET	[EE]
2	803A288010	PACKING CUSHION	[EE]
3	-----	ACCESSORY-A	
4	-----	ACCESSORY-B	
5	801C112070	PACKING CASE	[EE]
ACCESSORY - A			
	872C053070	INSTRUCTION BOOK	[EE]
	872C038080	INSTRUCTION BOOK	[P]
	851B545010	SHEET CAUTION DEW	
	831D198020	PACKING BAG	[EE]
ACCESSORY - B			
21	831D181020	PACKING BAG	[EE]
22	829C054070	PACKING SHEET	[EE]
23	242D231030	CABLE	1.5m
24	-----	BATTERY	
25	939P424010	REMOTE HAND UNIT	

3. ELECTRICAL PARTS

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION		SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	
INTEGRATED CIRCUITS					Q 4A1	260P560010	TRANSISTOR	2SA933S-R, S	
IC 51	266P323010	IC	M5144P	[EE]	Q 4A2	260P559060	TRANSISTOR	2SC1740S-S, E	
IC101	272P150010	IC	M51496P		Q 4A3	260P560040	TRANSISTOR	2SA933S-S	
IC102	266P192010	IC	LA7910		Q 4A5	260P559060	TRANSISTOR	2SC1740S-S, E	
IC201	272P221020	IC	XRA7254S		Q 4B5	260P559040	TRANSISTOR	2SC1740S-R, S	
IC2A0	272P232020	IC	BA7255BS		Q 4B6	260P559040	TRANSISTOR	2SC1740S-R, S	
IC2A1	272P265010	IC	BA7021		Q 4C0	260P603010	TRANSISTOR	DTA124ES/UN4112	
IC2H0	272P274010	IC	TL8709P		Q 501	260P560010	TRANSISTOR	2SA933S-R, S	
IC310	272P234010	IC	LA7295		Q 502	260P632010	TRANSISTOR	DTC124ES	
IC311	272P400010	IC	NJM2233BL		Q 503	260P560010	TRANSISTOR	2SA933S-R, S	
IC4A0	263P194020	IC	BU2821S		Q 506	260P560010	TRANSISTOR	2SA933S-R, S	
IC4A1	272P237010	IC	LA6324N		Q 507	260P559060	TRANSISTOR	2SC1740S-S, E	
IC4A2	272P235010	IC	TA7291S		Q 508	260P632010	TRANSISTOR	DTC124ES	
IC501	263P610010	IC	M50455-090SP		Q 571	268P014020	PHOTO TRANSISTOR	PN205L-(NC)	
IC5A0	263P549020	IC	M37420M6-463SP		Q 572	268P014020	PHOTO TRANSISTOR	PN205L-(NC)	
IC651	272P494010	IC	M52063SP	[P]	Q 574	268P044010	PHOTO INTERRUPTER	ON2270-R	
IC6A0	272P271030	IC	LA7333		Q 575	268P045010	PHOTO INTERRUPTER	GP1L52	
IC8A0	263P532030	IC	μ PD75216AGF-646-		Q 5A5	260P632010	TRANSISTOR	DTC124ES	
IC8A1	263P170020	IC	CAT35C102P/S-292		Q 5A7	260P559060	TRANSISTOR	2SC1740S-S, E	
IC8A2	266P010020	IC	μ PC574J-K		Q 5A8	260P419030	TRANSISTOR	2SC2724-D	
IC901	272P237010	IC	LA6324N		Q 5B4	260P559040	TRANSISTOR	2SC1740S-R, S	
TRANSISTORS					Q 5B8	260P559040	TRANSISTOR	2SC1740S-R, S	
Q 51	260P419030	TRANSISTOR	2SC2724-D	[EE]	Q 5C0	260P632010	TRANSISTOR	DTC124ES	
Q 52	260P419030	TRANSISTOR	2SC2724-D	[EE]	Q 5C1	260P603010	TRANSISTOR	DTA124ES/UN4112	
Q 53	260P419030	TRANSISTOR	2SC2724-D	[EE]	Q 6A1	260P654020	TRANSISTOR	2SC2058S-P	[P]
Q 54	260P560040	TRANSISTOR	2SA933S-S	[EE]	Q 6A2	260P654020	TRANSISTOR	2SC2058S-P	
Q 55	260P419030	TRANSISTOR	2SC2724-D	[EE]	Q 6A3	260P654020	TRANSISTOR	2SC2058S-P	
Q 101	260P419030	TRANSISTOR	2SC2724-D		Q 6A4	260P560010	TRANSISTOR	2SA933S-R, S	
Q 102	260P560040	TRANSISTOR	2SA933S-S		Q 6K0	260P603010	TRANSISTOR	DTA124ES/UN4112	[P]
Q 107	260P419030	TRANSISTOR	2SC2724-D		Q 6K1	260P559040	TRANSISTOR	2SC1740S-R, S	[P]
Q 208	260P560010	TRANSISTOR	2SA933S-R, S		Q 6M1	260P654020	TRANSISTOR	2SC2058S-P	[P]
Q 210	260P419030	TRANSISTOR	2SC2724-D		Q 6M2	260P654020	TRANSISTOR	2SC2058S-P	[P]
Q 231	260P560010	TRANSISTOR	2SA933S-R, S		Q 6M3	260P603010	TRANSISTOR	DTA124ES/UN4112	[P]
Q 232	260P559040	TRANSISTOR	2SC1740S-R, S		Q 8A0	260P559040	TRANSISTOR	2SC1740S-R, S	
Q 233	260P419030	TRANSISTOR	2SC2724-D		Q 8A1	260P560010	TRANSISTOR	2SA933S-R, S	
Q 234	260P419030	TRANSISTOR	2SC2724-D		Q 8A2	260P560010	TRANSISTOR	2SA933S-R, S	
Q 271	260P560010	TRANSISTOR	2SA933S-R, S		Q 8A5	260P560010	TRANSISTOR	2SA933S-R, S	
Q 272	260P632010	TRANSISTOR	DTC124ES		Q 8A8	260P559060	TRANSISTOR	2SC1740S-S, E	
Q 273	260P632010	TRANSISTOR	DTC124ES		Q 901	260P560010	TRANSISTOR	2SA933S-R, S	
Q 274	260P632010	TRANSISTOR	DTC124ES		Q 902	260P628060	TRANSISTOR	2SA1619A-Q, R, S	
Q 275	260P632010	TRANSISTOR	DTC124ES		Q 906	260P630010	TRANSISTOR	2SD2012	
Q 276	260P632010	TRANSISTOR	DTC124ES		Q 907	260P630010	TRANSISTOR	2SD2012	
Q 277	260P603010	TRANSISTOR	DTA124ES/UN4112		Q 908	260P630010	TRANSISTOR	2SD2012	
Q 2A0	260P560010	TRANSISTOR	2SA933S-R, S		Q 971	260P630010	TRANSISTOR	2SD2012	
Q 2A1	260P603010	TRANSISTOR	DTA124ES/UN4112		DIODES				
Q 2A4	260P654020	TRANSISTOR	2SC2058S-P		D 51	264P077010	DIODE	MC301	[EE]
Q 2A5	260P654020	TRANSISTOR	2SC2058S-P		D 52	264P093080	DIODE	HZ7B-3	[EE]
Q 2A6	260P654020	TRANSISTOR	2SC2058S-P		D 201	264P568010	DIODE	1SS252	
Q 2A9	260P562040	TRANSISTOR	2SA952-K		D 203	264P568010	DIODE	1SS252	
Q 2B0	260P255040	TRANSISTOR	2SA950-Y		D 204	264P568010	DIODE	1SS252	
Q 2C0	260P632010	TRANSISTOR	DTC124ES		D 2A2	264P568010	DIODE	1SS252	
Q 2M0	260P560010	TRANSISTOR	2SA933S-R, S		D 2A3	264P568010	DIODE	1SS252	
Q 2M1	260P560010	TRANSISTOR	2SA933S-R, S		D 2A4	264P568010	DIODE	1SS252	
Q 310	260P629060	TRANSISTOR	2SC3331-S, T, U		D 2A5	264P568010	DIODE	1SS252	

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION
D 2A6	264P568010	DIODE	1SS252	CF 53	296P014030	CERAMIC FILTER	SFE-6. 0MA [EE]
D 2M0	264P568010	DIODE	1SS252	CF 54	299P034040	CERAMIC RESONATOR	[EE]
D 2M1	264P568010	DIODE	1SS252	CF 55	296P014020	CERAMIC FILTER	SFE-5. 5MA [EE]
D 2Y1	264P568010	DIODE	1SS252	CF101	296P104010	CERAMIC TRAP	EFC-S3F01W3A [EE]
D 4A1	264P568010	DIODE	1SS252	CF101	296P024030	CERAMIC FILTER	TPS5. 5MB [P]
D 4A6	264P568010	DIODE	1SS252	CF151	296P014090	CERAMIC FILTER	SFE-5. 5MC2 [P]
D 501	264P568010	DIODE	1SS252	CF152	296P121020	CERAMIC FILTER	[EE]
D 570	264P307020	LIGHT EMITTING DIODE	GL-451	CF152	296P121010	CERAMIC FILTER	[P]
D 571	264P515010	DIODE	MA165	CF5A0	299P118020	CERAMIC RESONATOR	CST8. 00MT
D 5A0	264P568010	DIODE	1SS252	DL6A1	337P160010	COMB FILTER	EFD-VR645A45H [P]
D 5A3	264P568010	DIODE	1SS252	LPF2A0	409P633010	LOW PASS FILTER	
D 5A4	264P568010	DIODE	1SS252	LPF6A0	409P543010	LOW PASS FILTER	
D 5A6	264P568010	DIODE	1SS252	SF101	296P119030	SAW FILTER	
D 5B9	264P452030	DIODE	HZ5C3	DELAY LINES			
D 5C0	264P568010	DIODE	1SS252	DL6A0	337P166010	DELAY LINE	EFD-JF124A13J
D 5C1	264P568010	DIODE	1SS252	COILS			
D 5C9	264P568010	DIODE	1SS252	L 11	325C111030	PEAKING COIL	10 μ H-K
D 5D2	264P568010	DIODE	1SS252	L 51	325C166020	PEAKING COIL	8. 2 μ H-J [EE]
D 6A0	264P568010	DIODE	1SS252	L 52	325C167090	PEAKING COIL	220 μ H-J [EE]
D 701	264P572010	LIGHT EMITTING DIODE	SEL 2210R	L 53	325C168060	PEAKING COIL	820 μ H-J [EE]
D 8A1	264P568010	DIODE	1SS252	L 54	325C166030	PEAKING COIL	10 μ H-J [EE]
D 8A2	264P568010	DIODE	1SS252	L 55	325C167050	PEAKING COIL	100 μ H-J [EE]
D 8A3	264P568010	DIODE	1SS252	L 102	323P175010	VIF COIL	LLD-TANK (38. 9 39. 5MHz)
D 8A4	264P568010	DIODE	1SS252	L 103	323P175090	VIF COIL	AFT (38. 9 39. 5MHz)
D 8B0	264P568010	DIODE	1SS252	L 107	325C170050	PEAKING COIL	2. 2 μ H-K
D 8B1	264P568010	DIODE	1SS252	L 108	325C166000	PEAKING COIL	5. 6 μ H-J [EE]
D 8B2	264P568010	DIODE	1SS252	L 108	325C166050	PEAKING COIL	15 μ H-J [P]
D 8C0	264P568010	DIODE	1SS252	L 109	325C166060	PEAKING COIL	18 μ H-J
D 8J3	264P568010	DIODE	1SS252	L 110	325C120070	PEAKING COIL	3. 3 μ H-K [EE]
D 8J4	264P568010	DIODE	1SS252	L 113	325C165030	PEAKING COIL	1. 5 μ H-J [EE]
D 8J5	264P568010	DIODE	1SS252	L 113	325C165040	PEAKING COIL	1. 8 μ H-J [P]
D 8J7	264P568010	DIODE	1SS252	L 152	325C166090	PEAKING COIL	33 μ H-J [EE]
D 8Z0	264P501040	DIODE	HZ3ALL	L 152	325C167010	PEAKING COIL	47 μ H-J [P]
D 8Z1	264P459030	DIODE	RD4. 7EB1	L 153	325C121040	PEAKING COIL	12 μ H-K
D 8Z2	264P193080	DIODE	MZ30982/HZ9824	L 154	325C166090	PEAKING COIL	33 μ H-J
D 8Z3	264P342070	DIODE	HZ4C2	L 201	325C122050	PEAKING COIL	100 μ H-K
D 901	264P101050	DIODE	RM 1B	L 203	325C168010	PEAKING COIL	330 μ H-J
D 902	264P101050	DIODE	RM 1B	L 204	325C167030	PEAKING COIL	68 μ H-J
D 903	264P101050	DIODE	RM 1B	L 206	325C166070	PEAKING COIL	22 μ H-J
D 904	264P101050	DIODE	RM 1B	L 210	325C166070	PEAKING COIL	22 μ H-J
D 905	264P101050	DIODE	RM 1B	L 211	325C166000	PEAKING COIL	5. 6 μ H-J
D 906	264P101050	DIODE	RM 1B	L 213	325C122050	PEAKING COIL	100 μ H-K
D 907	264P101050	DIODE	RM 1B	L 218	325C167070	PEAKING COIL	150 μ H-J
D 908	264P101050	DIODE	RM 1B	L 219	325C167040	PEAKING COIL	82 μ H-J
D 913	264P500020	DIODE	EM01Z	L 220	325C167080	PEAKING COIL	180 μ H-J
D 914	264P500020	DIODE	EM01Z	L 223	325C166060	PEAKING COIL	18 μ H-J
D 915	264P568010	DIODE	1SS252	L 224	325C166070	PEAKING COIL	22 μ H-J
D 916	264P568010	DIODE	1SS252	L 2A0	325C107050	PEAKING COIL	100 μ H-J
D 917	264P104040	DIODE	HZ30-2	L 2A1	325C167060	PEAKING COIL	120 μ H-J
FILTERS				L 2A8	325C122050	PEAKING COIL	100 μ H-K
BPF6A0	409P541010	BAND PASS FILTER		L 2A9	325C167010	PEAKING COIL	47 μ H-J
BPF6A1	409P540010	BAND PASS FILTER		L 2F3	325C111090	PEAKING COIL	33 μ H-K
CF 51	296P014020	CERAMIC FILTER	SFE-5. 5MA [EE]				
CF 52	296P014040	CERAMIC FILTER	SFE-6. 5MA [EE]				

SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION		SYMBOL NO.	PARTS NO.	PARTS NAME	DESCRIPTION	
L 2H0	325C122050	PEAKING COIL	100 μ H-K		SWITCHES				
L 2H1	325C166090	PEAKING COIL	33 μ H-J		S 8A1	432P089040	KEY BOARD SWITCH	STILL/PAUSE	
L 2H2	325C166090	PEAKING COIL	33 μ H-J		S 8A2	432P089040	KEY BOARD SWITCH	FF	
L 310	321C010040	RF COIL	1000 μ H-J		S 8A3	432P089040	KEY BOARD SWITCH	STOP	
L 311	321C015050	RF COIL	8200 μ H-J		S 8A4	432P089040	KEY BOARD SWITCH	POWER	
L 312	321C011050	RF COIL	8200 μ H-J		S 8A5	432P089040	KEY BOARD SWITCH	REW	
L 4A0	325C121030	PEAKING COIL	10 μ H-K		S 8A6	432P089040	KEY BOARD SWITCH	REC	
L 501	325C262050	PEAKING COIL	100 μ H-K		S 8A7	432P089040	KEY BOARD SWITCH	PLAY	
L 502	325C266050	PEAKING COIL	15 μ H-J		S 8A8	432P089040	KEY BOARD SWITCH	CH-DOWN	
L 503	325C122050	PEAKING COIL	100 μ H-K		S 8A9	432P089040	KEY BOARD SWITCH	CH-UP	
L 507	325C266030	PEAKING COIL	10 μ H-J		S 8B0	432P089040	KEY BOARD SWITCH	EJECT	
L 570	299P124010	LATCH MAGNET			SW570	439P019010	MODE SELECT SWITCH		
L 5A1	325C122050	PEAKING COIL	100 μ H-K		SW571	439P020010	LIMIT SWITCH		
L 5A2	325C266070	PEAKING COIL	22 μ H-J		MISCELLANEOUS				
L 5A4	325C124080	PEAKING COIL	0.56 μ H-M			242D297020	IF CABLE		
L 5A5	325C124050	PEAKING COIL	0.33 μ H-M		CU 01	295P274020	RF CONVERTER	MDLK6E4	[EE]
L 5A6	325C124050	PEAKING COIL	0.33 μ H-M		CU 01	295P276010	RF CONVERTER		[P]
L 651	325C122050	PEAKING COIL	100 μ H-K	[P]	DC CC	243C061020	CARD LEAD	9P	
L 6A0	325C166060	PEAKING COIL	18 μ H-J		DM CM	243C061070	CARD LEAD	21P	
L 6A1	325C165070	PEAKING COIL	3.3 μ H-J		F 901	283D046080	FUSE	0.63A-T	
L 6A3	325C166050	PEAKING COIL	15 μ H-J		F 902	283D047050	FUSE	2.5A-T	
L 6K0	325C166050	PEAKING COIL	15 μ H-J	[P]	F 903	283D047050	FUSE	2.5A-T	
L 6K1	325C166050	PEAKING COIL	15 μ H-J	[P]	F 904	283D046080	FUSE	0.63A-T	[P]
T 51	327P052010	SIF COIL	6MHz	[EE]	J 2A0	440C175030	PIN JACK (4P)		
TRANSFORMERS					M 470	288P107020	CAPSTAN MOTOR		
T 310	409P423010	AUDIO BIAS OSC	705720044D		M 570	288P088020	DRUM MOTOR		
T 901	350P517030	POWER		[EE]	M 571	288D025010	LOADING MOTOR		
T 901	350P450050	POWER	110/120/220/240V	[P]	MF VF	243C021010	CARD LEAD		
VARIABLE RESISTORS					MX PX	243C077090	CARD LEAD	11P	
VR101	127C080090	VR-SEMIFIXED	1/5W B20k Ω -M		S 971	459P003010	VOLTAGE SELECTOR		[P]
VR202	127C290040	VR SEMIFIXED	1/10W B1k Ω -N		T 370	460P060050	HEAD		
VR203	127C290080	VR-SEMIFIXED	1/10W B10k Ω -N		T 371	460P061020	FE HEAD		
VR2A0	127C080080	VR-SEMIFIXED	1/5W B10k Ω -M		TK MK	243C048060	CARD LEAD	21P	
VR2A1	127C080080	VR-SEMIFIXED	1/5W B10k Ω -M		TL VL	243C077090	CARD LEAD	11P	
VR2A2	127C090090	VR-SEMIFIXED	1/5W B20k Ω -M		TU 01	295P260010	TUNER	ENV-57818F2	[EE]
VR2A3	127C081020	VR-SEMIFIXED	1/5W B100k Ω -M		TU 01	295P254010	TUNER	ENV-77818F2	[P]
VR2A4	127C081020	VR-SEMIFIXED	1/5W B100k Ω -M		V 8A0	253P081030	TUBE FLUOR	9-MT-106GK	
VR2A5	127C080070	VR-SEMIFIXED	1/5W B5k Ω -M		X 501	285P084010	CRYSTAL RESONATOR		
VR2F0	127C080070	VR-SEMIFIXED	1/5W B5k Ω -M		X 6A0	285P083010	CRYSTAL RESONATOR		
VR310	127C281020	VR SEMIFIXED	1/10W B100k Ω -N		X 8A0	285P063040	CRYSTAL RESONATOR	4.194304MHz	
VR311	127C280080	VR SEMIFIXED	1/10W B10k Ω -N		Z 8A0	939P359010	PREAMP UNIT		
VR4A0	127C081020	VR-SEMIFIXED	1/5W B100k Ω -M		PRINTED CIRCUIT BOARD ASSY'S				
VR652	127C190080	VR-SEMIFIXED	1/5W B10k Ω -M	[P]	928C510070	DECK PCB ASSY			
RESISTORS					928B936004	HEAD-AMP PCB ASSY			
R 904	109P052010	FUSE	1/4W 100 Ω -J		927B404009	MAIN PCB ASSY			[EE]
R 920	103P378090	FUSE	1/4W 5.6 Ω -J		927B404003	MAIN PCB ASSY			[P]
CAPACITORS AND TRIMMERS					927B431001	POWER PCB ASSY			[P]
VC8A0	202P109020	TRIMMER CAPACITOR	4.2pF-20pF		928C770002	SIF/K PCB ASSY			[EE]
					927B405001	TIMER PCB ASSY			
					928C580001	VOL-SELE PCB ASSY			[P]

A B C D E F G H I J K

1

ASSEMBLY DECK-3

2

3

4

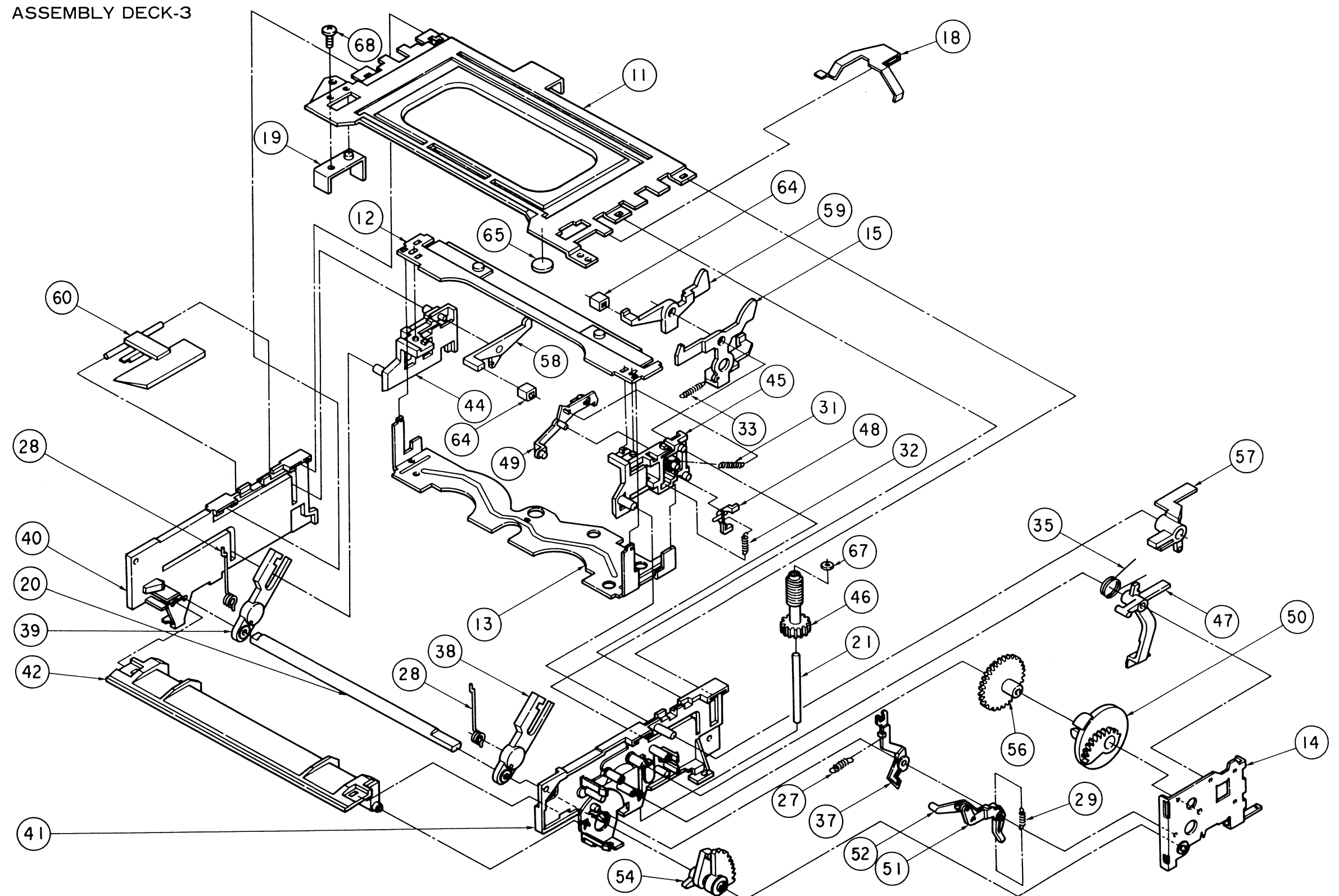
5

6

7

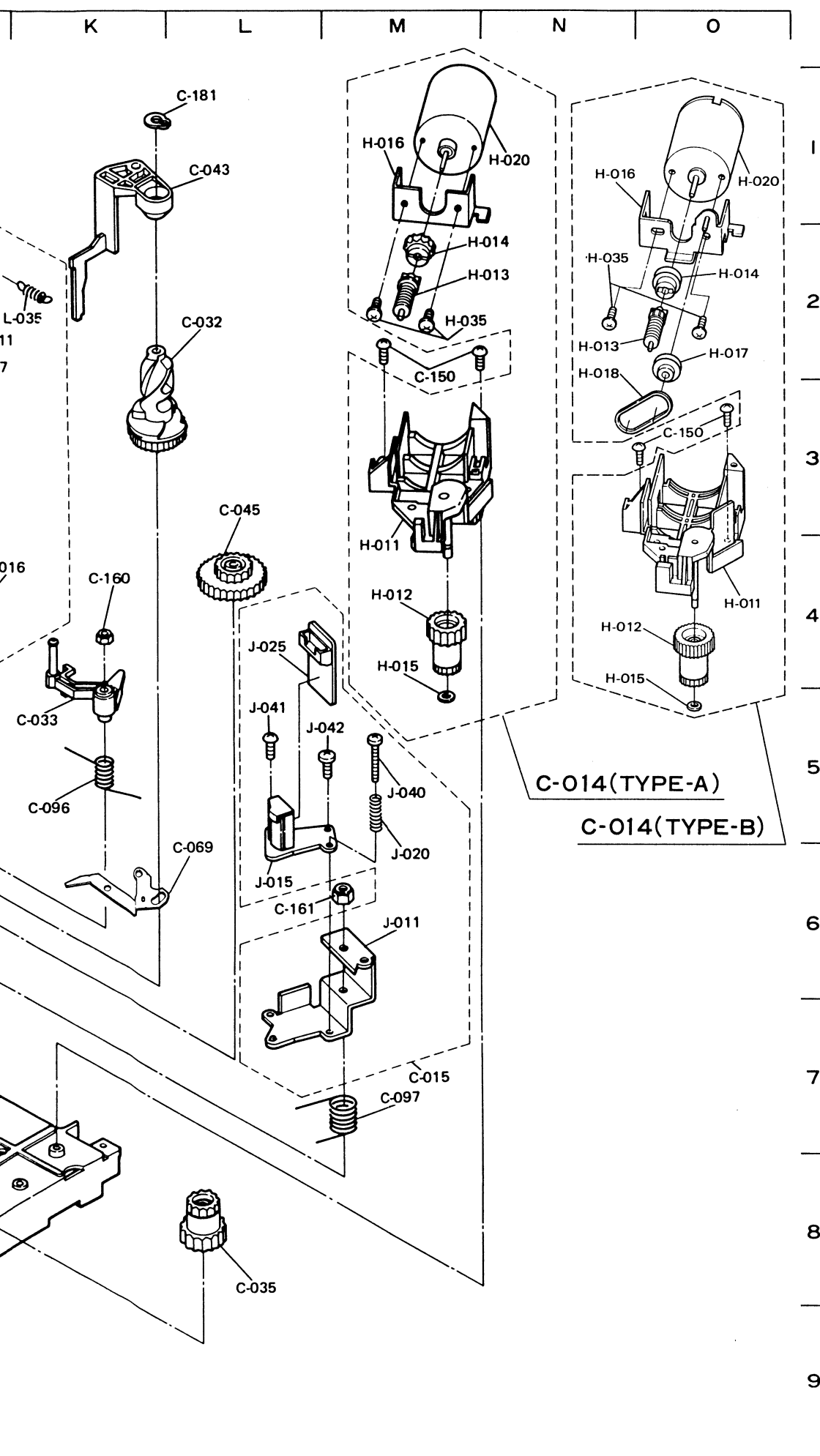
8

9



* Settelled Service Parts

ITEM	PARTS No.	*	ADDRESS	PARTS NAME	DESCRIPTION	Qt.
11	591B545010		F-2	PLATE-ROOF		01
12	593C001010		D-3	PLATE-UPPER-P		01
13	591B546010		E-7	PLATE-BOTTOM		01
14	591B542010		K-8	PLATE-SIDE-TU		01
15	592C851010		H-3	LEVER-LOCK-FL		01
18	596D150010		H-2	PLATE-EARTH		01
19	596D217010		C-3	PLATE-GUARD		01
20	631D134010		A-6	SHAFT-FL		01
21	631D135010		H-7	SHAFT-WORM		01
27	(not used)					
28	572D301010	○	A-5	D-7 SPRING-FL		02
29	572D389010		J-8	SPRING-DOOR-SUB		01
31	572D304010		G-5	SPRING-OPENER-LID		01
32	572D305010		H-5	SPRING-JUT-FL		01
33	572D380010		G-5	SPRING-LEVER-LOCK		01
35	572D367010		I-6	SPRING-LEVER-SW		01
37	(not used)					
38	641B315010	○	D-7	ARM-FL		01
39	641B315020	○	A-7	ARM-FL		01
40	641A110010		A-6	HOLDER-SIDE-SP		01
41	641A109010		A-8	HOLDER-SIDE-TU		01
42	641B306010		A-7	GUIDE-INSERT		01
44	641B309010		D-5	HOUSING-CASSETTE-SP		01
45	641B307010		G-5	HOUSING-CASSETTE-TU		01
46	621D513010	○	H-6	GEAR-WORM-FL		01
47	621D514010		K-7	LEVER-SW-FL		01
48	621D515010	○	H-5	JUT		01
49	641C794010		E-5	OPENER-LID-CAS		01
50	641C793010	○	K-7	GEAR-DRIVE		01
51	641C897010	○	H-9	ARM-FL-DOOR-A		01
52	641C898010	○	H-9	ARM-FL-DOOR-B		01
54	641C858010	○	F-9	ARM-LOCK		01
56	641C814010	○	I-8	GEAR-W-H-F/L		01
57	641C857010		K-5	LEVER-PICK-CAS		01
58	621D585010		E-4	LEVER-CAS-SP		01
59	621D586010		G-3	LEVER-CAS-TU		01
60	641C878010		A-4	STOPPER-SP-FL		01
64	642D494010		D-5	G-3 RUBBER-FL		02
65	(not used)					
67	552C003040		H-6	WASHER-THRUST	3 T0.5	01
68	-----		D-2	SCREW	2.6-5	01



* Settled Service Parts

ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
B-015	948B284003	○ B-2	ASSY-DRUM	(HD), (EE), (NZ), (P)	01
B-015	948B284019	○ B-2	ASSY-DRUM	(E), (Y), (IR), M33(Y)	01
M-010	928B816090	○ B-3	ASSY-UPPER-DRUM		01
M-030	288P088020	○ C-3	MOTOR-DRUM	M570	01
D-011	948A071020	J-9	ASSY-MAIN-PLATE		01
D-012	948D018040	○ D-6	ASSY-TAPE-GUIDE-S		01
D-012	948D018050	○ D-6	ASSY-TAPE-GUIDE-S		01
D-012	948D018060	○ D-6	ASSY-TAPE-GUIDE-S		01
E-011	635B059010	○ E-6	TAPE-GUIDE-S		01
E-011	635B059020	○ E-6	TAPE-GUIDE-S		01
E-011	635B059030	○ E-6	TAPE-GUIDE-S		01
E-016	522D177010	○ E-5	GUIDE-ROLLER		01
E-021	669D197020	○ E-6	SET-SCREW-F	M3×0.5-4	01
D-013	948D019040	○ E-7	ASSY-TAPE-GUIDE-T		01
D-013	948D019050	○ E-7	ASSY-TAPE-GUIDE-T		01
D-013	948D019060	○ E-7	ASSY-TAPE-GUIDE-T		01
F-011	635B060010	○ F-6	TAPE-GUIDE-T		01
F-011	635B060020	○ F-6	TAPE-GUIDE-T		01
F-011	635B060030	○ F-6	TAPE-GUIDE-T		01
F-016	522D177010	○ F-6	GUIDE-ROLLER		01
F-021	669D197020	○ F-6	SET-SCREW-F	M3×0.5-4	01
D-036	621D522010	○ E-7	SLIDER		02
C-015	928D032030	○ M-7	ASSY-AC-HEAD		01
J-011	592C760010	M-6	ARM-AC		01
J-015	460P060050	○ L-6	HEAD-AC	T370	01
J-020	570D593010	M-6	SPRING-AC		01
J-025	215C393010	L-4	PWB-AC-F		01
J-040	650P261040	M-5	SCREW-F-FE-PAN	M2.6×0.45-14	01
J-041	669D227010	○ L-5	SCREW-TS	M2.6×6	01
J-042	669D206030	L-5	SCREW		01
C-016	928D033010	B-4	ASSY-FE-HEAD		01
K-011	460P061020	○ B-5	HEAD-FE	T371	01
K-015	641C870010	B-4	HOLDER-FE		01
C-017	948D020010	○ I-1	ASSY-ARM-PINCH		01
L-011	591B536010	J-2	ARM-PINCH		01
L-015	621D523010	○ J-3	CAP-ROLLER		01
L-016	641C797010	○ J-4	LEVER-CAM-PINCH		01
L-017	641C798010	○ J-2	LEVER-ARM-PINCH		01
L-025	522D174010	○ J-2	ROLLER-PINCH		01
L-035	572D314010	○ K-2	SPRING-PINCH		01
L-036	572D315010	○ J-4	SPRING-CAM-PINCH		01
C-030	641B368010	○ E-3	ARM-TENS-REG-S2		01
C-031	591B551010	○ I-3	ARM-TENS-REG-T		01
C-032	641B314020	○ L-2	CAM-PINCH		01
C-033	635B068010	○ K-5	ARM-TU-G		01
C-035	641C782010	○ L-8	GEAR-JOINT		01
C-036	641C791010	○ G-3	BRAKE-MAIN-S		01
C-037	641C792010	○ H-4	BRAKE-MAIN-T		01
C-039	641C796010	○ D-2	LEVER-TENS		01
C-041	641C991010	○ J-4	ARM-GEAR-TU-G2		01
C-042	641C804010	○ F-5	LEVER-REC-SAFETY		01
C-043	641C806010	○ L-1	CAP-ARM-PINCH		01
C-044	641C861010	E-1	HOLDER-T-BAND		01
C-045	621D509010	○ L-3	GEAR-1		01
C-050	522C076020	○ H-2	UNIT-REEL-DISK		01
C-052	641B319010	○ C-5	UNIT-IMP-ROLLER		01
C-053	522C076040	○ H-2	UNIT-REEL-DISK		01
C-062	591B547010	○ F-3	ARM-TENSION		01
C-063	591B552010	○ F-1	BELT-TENS-BRAKE		01

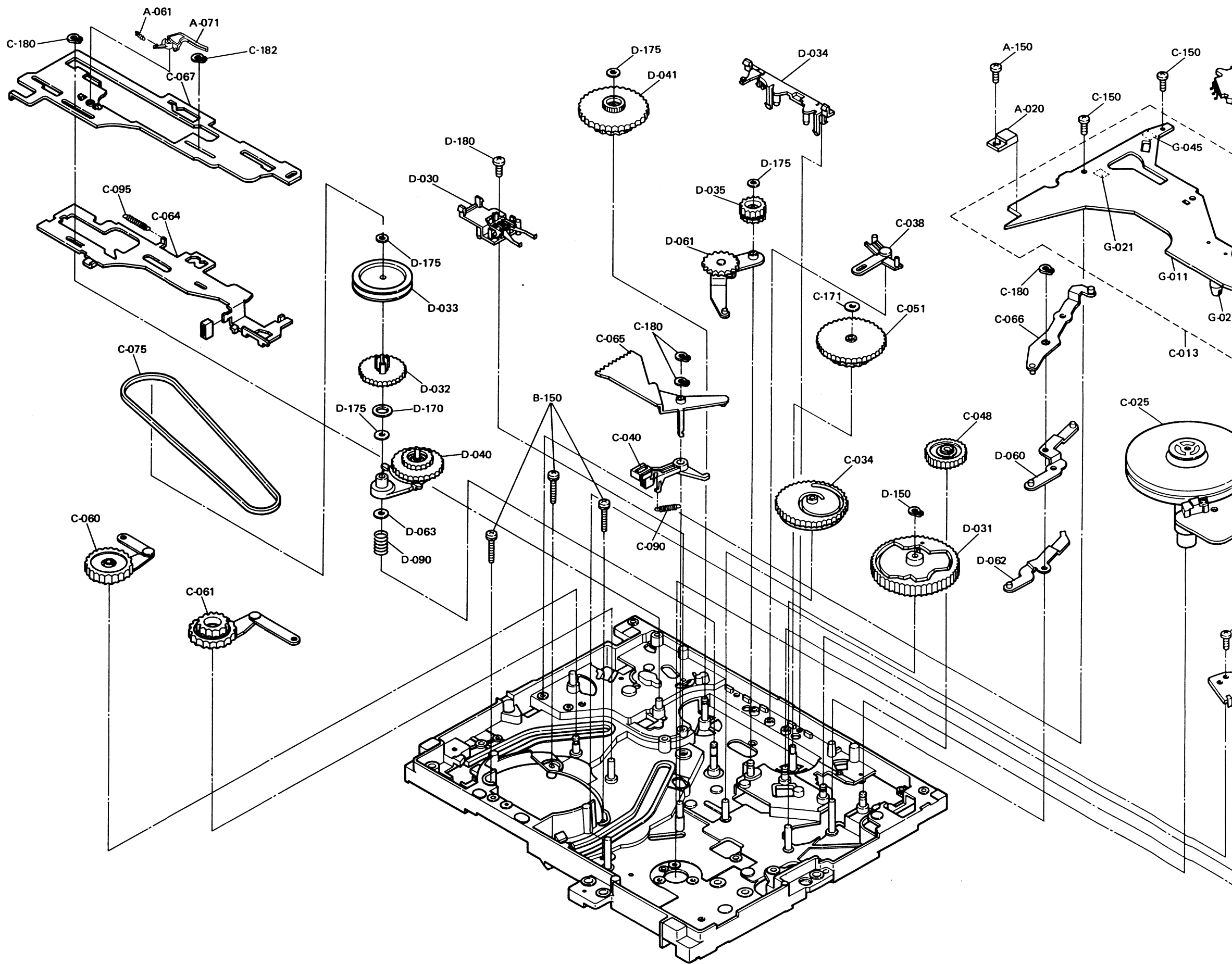
* Settled Service Parts

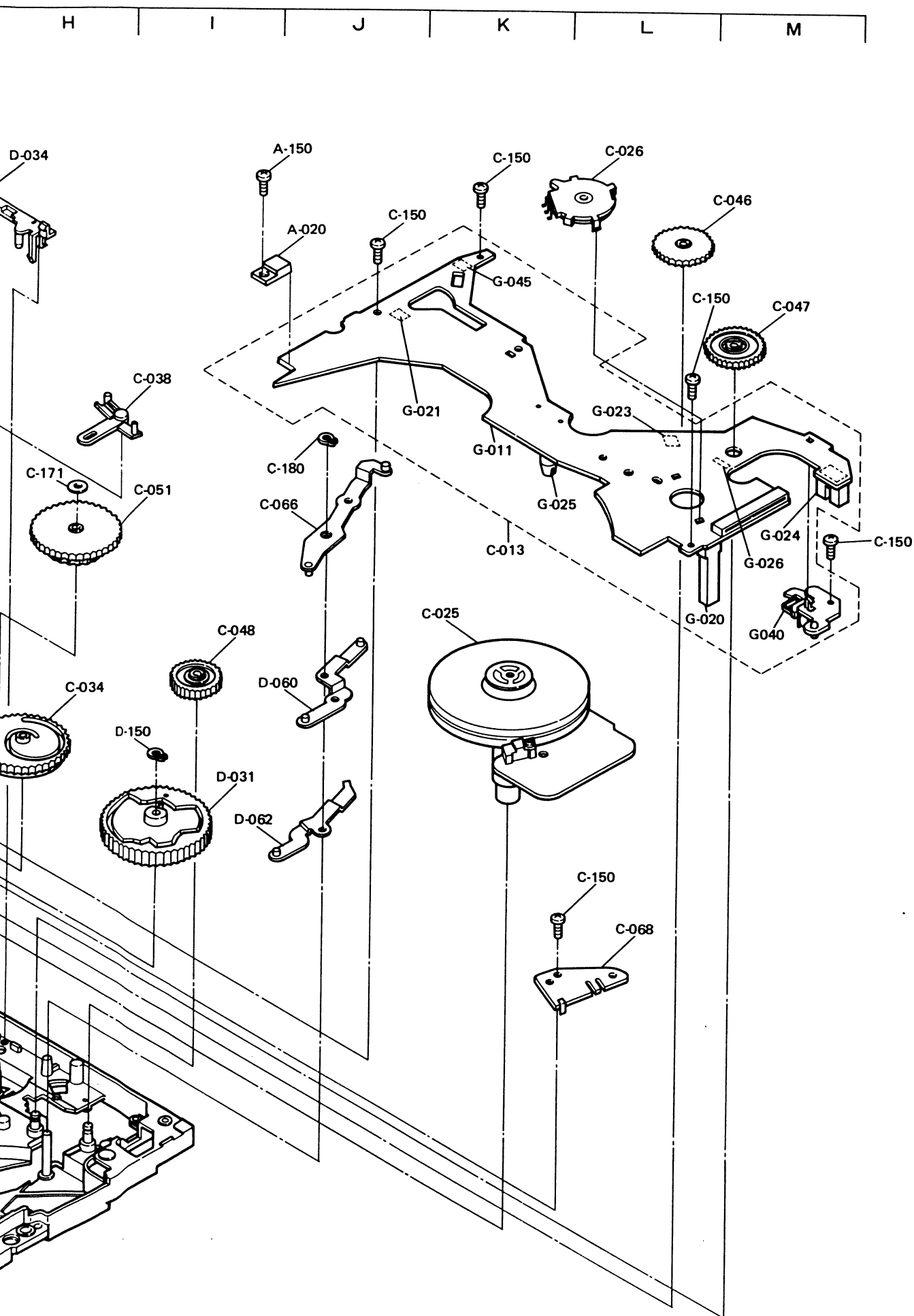
ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
C-069	592C930010	L-6	LEVER-TENS-TU		01
C-070	631D136010	○ I-5	NUT-TAPER		01
C-091	572D309010	○ H-4	SPRING-M-B		02
C-092	572D391010	○ E-2	SPRING-TENS-REG-S2		01
C-093	572D390010	○ I-4	SPRING-TENS-REG-T2		01
C-094	572D312010	○ F-3	SPRING-TENS		01
C-096	572D317010	○ K-5	SPRING-TU-G		01
C-097	572D318010	○ M-7	SPRING-ARM-A/C		01
C-098	572D328010	○ D-2	SPRING-REC-SAFETY		01
C-150	669D227010	○ M-2	(0-3) SCREW-TS	M2.6×6	02
C-151	669D227030	○ C-4	SCREW-TS	M2.6×10	01
C-152	669D228010	E-1	SCREW-TS-SEMS	M2.6×6	01
C-154	669D285040	J-6	SCREW-TB-PAN	M2.6×8	03
C-160	674D081020	○ K-4	NUT-NYLON	M3×0.5	01
C-161	674D100010	○ L-6	NUT-NYLON-S	M4×0.7	01
C-175	552C007030	○ I-3	CUT-WASHER	2.5	01
C-180	685C009010	○ F-2	GRIP-RING		01
C-181	685C009020	○ L-1	GRIP-RING		01
A-040	299C025010	○ G-1	BRUSH		01
A-055	590A256020	○ A-6	UNIT-F/L-F		01
A-060	572D401010	○ I-4	SPRING-RS		01
A-070	641C906010	F-9	HOLDER-CARD		01
A-150	669D227010	○ G-1	SCREW-TS	M2.6×6	01
A-151	669D227020	○ A-5	D-7 SCREW-TS	M2.6×8	02
TYPE-A					
C-014	928D031010	○ N-5	ASSY-LOAD-MOTOR		01
H-011	641B313010	○ M-4	HOLDER-MOTOR		01
H-012	641C783010	M-4	GEAR-WHEEL		01
H-013	641C801010	M-2	GEAR-WORM		01
H-014	621D525010	M-2	CUPLING		01
H-015	552C007030	○ M-4	CUT-WASHER	2.5	01
H-016	596D157010	M-1	PLATE-HOLDER-M		01
H-020	288D025010	○ M-1	MOTOR-LOADING	M571	01
H-035	650P300030	M-2	SCREW-F-FE-PAN	M3×0.5-3	02
TYPE-B					
C-014	928D031010	○ N-5	ASSY-LOAD-MOTOR		01
H-011	641B313010	○ O-4	HOLDER-MOTOR		01
H-012	641C783010	N-4	GEAR-WHEEL		01
H-013	641C801010	N-2	GEAR-WORM		01
H-014	621D784010	○ O-2	CUPLING-2		01
H-015	552C007030	○ N-4	CUT-WASHER	2.5	01
H-016	593C059010	N-1	PLATE-HOLDER-M2		01
H-017	621D793010	○ O-1	PULLEY-L		01
H-018	521D074010	○ N-2	BELT-LM		01
H-020	288D025010	○ O-1	MOTOR-LOADING	M571	01
H-035	650P300030	N-2	SCREW-F-FE-PAN	M3×0.5-3	02

A B C D E F G H I J K

ASSEMBLY DECK-2

1
2
3
4
5
6
7
8
9





* Settled Service Parts

ITEM	PARTS No.	* ADDRESS	PARTS NAME	DESCRIPTION	Qt.
B-150	669D431040	E-4	SCREW-SEMS	M2. 6×0. 45-10 (HD), (EE), (NZ), (P)	03
B-150	669D200040	E-4	SCREW-SEMS	M2. 6×0. 45-10 (E), (Y), (1R), M33(Y)	03
D-030	641B310010	○ E-2	UNIT-LEVER-SHIFT		01
D-031	641B323010	○ I-5	CAM-MAIN-1		01
D-032	641C789020	○ D-4	PULLEY-GEAR		01
D-033	641C790010	○ D-3	PULLEY-BELT		01
D-034	641C815010	○ H-1	HOLDER-P-CAM		01
D-035	621D516010	○ G-2	GEAR-F/L-1		01
D-040	522C077020	○ E-5	UNIT-GEAR-IDLER		01
D-041	522C083010	○ F-2	UNIT-GEAR-REELS		01
D-060	591B559010	○ I-5	LEVER-C		01
D-061	591B567010	○ G-3	LEVER-F/L-ID		01
D-062	592C830010	○ I-6	LEVER-RS		01
D-063	596D057010	○ D-5	WASHER-R	T=0. 3	01
D-090	572D306010	○ D-6	SPRING-SHIFT		01
D-150	685C009010	○ H-5	GRIP-RING		01
D-170	552C010040	○ D-4	WASHER-THRUST	6. 7×12×0. 13	01
D-175	552C007030	○ D-3	CUT-WASHER	2. 5	04
D-180	669D227010	○ G-2	SCREW-TS	M2. 6×6	01
C-013	928C510070	○ K-4	ASSY-PWB-DECK		01
G-011	240A651010	○ K-3	PWB-DECK		01
G-020	268P014020	○ L-4	TRANSISTOR	Q571 PN205L-(NC)	01
G-021	268P014020	○ J-3	TRANSISTOR	Q572 PN205L-(NC)	01
G-023	268P044010	○ K-2	PHOTO- INTERRUPTER	Q574 ON2270-R	01
G-024	268P045010	○ M-4	PHOTO- INTERRUPTER	Q575 GP1L52	01
G-025	264P307020	○ K-4	DIODE-LE	D570 GL-451	01
G-026	264P515010	○ M-4	DIODE	D571 MA165	01
G-040	299P124010	○ M-4	LATCH-MAGNET	L570	01
G-045	439P020010	○ K-2	SW-LIMIT	SW571	01
C-025	288P107020	○ K-4	MOTOR-CP	M470	01
C-026	439P019010	○ L-1	SW-MODE-SELECT-F	SW570	01
C-034	641B324010	○ H-5	CAM-MAIN-2		01
C-038	641C795010	○ I-3	LEVER-IDLER-S		01
C-040	641C800010	○ F-5	BRAKE-CP		01
C-046	621D517010	○ L-1	GEAR-F/L-2		01
C-047	621D518010	○ M-2	GEAR-F/L-3		01
C-048	621D519010	○ I-4	GEAR-F/L-4		01
C-051	522C078040	○ I-3	UNIT-GEAR-REEL		01
C-060	591B543010	○ A-5	ARM-LOAD-S		01
C-061	591B544010	○ B-6	ARM-LOAD-T		01
C-064	591B554010	○ B-3	PLATE-CAM-C		01
C-065	591B557010	○ F-4	ARM-GEAR-LOAD		01
C-066	591B558010	○ J-4	LEVER-B		01
C-067	592C949010	○ B-1	UNIT-PLATE-CAM-B3		01
C-068	596D186010	○ L-6	PLATE-SHIELD-F		01
C-075	521D062010	○ B-4	BELT-REEL		01
C-090	572D308020	○ F-6	SPRING-B-CP		01
C-095	572D313010	○ B-2	SPRING-CAM-C		01
C-150	669D227010	○ J-2	SCREW-TS	M2. 6×6	05
C-171	552C006020	○ H-3	WASHER-THRUST	2. 0×0. 13	01
C-180	685C009010	○ A-1	GRIP-RING		04
C-182	552C009050	○ J-3	CUT-WASHER		01
A-020	260P630010	○ C-1	TRANSISTOR	0971 2SD2012	01
A-061	572D404010	○ J-2	SPRING-B-RS		01
A-071	641C928010	○ B-1	LEVER-B-RS		01
A-150	669D227010	○ I-1	SCREW-TS	M2. 6×6	01

SCHEMATIC DIAGRAM

NOTE 1:

1. DC voltages were measured from points indicated to the circuit ground with a digital voltmeter.
2. The voltages parenthesised are on SP recording mode. While those without parenthesised on SP play back mode.

NOTE 2:

1. The unit of resistance "ohm" entirely omitted. Accordingly, K = 1000 ohms M = 1000K ohms.

2. The wattage of resistor, not specifically designated, is 1/4 watt.

3. Resistors, not specifically designated, are carbon resistors.

4. The marks of resistors are as follows.

- CE : Cemented resistor
MB : Metal oxide film resistor (type B)
S : Fixed composition resistors
W : Wire wound resistor
M : Metal film resistor

5. The tolerance of resistor value, not specifically designated, is: $\pm 5\%$, K = $\pm 10\%$ M = $\pm 20\%$

6. The unit of capacitance, not specifically designated, is:

- a) μF , for numbers less than 1
b) PF, for numbers more than 1

7. Capacitors, not specifically designated are Ceramic capacitors except electrolytic capacitors.

8. The marks of capacitors are as follows:

- ALM : Aluminus electrolytic capacitor
MF : Polyester capacitor
PP : Polypropylene film capacitor
TAN : Tantalum capacitor
SC : Semiconductor Ceramic Capacitors
TF : Twin film capacitor
NP : Non polarized electrolytic capacitor

- * : Electrolytic capacitor

9. The DC working voltage of capacitor, not specifically designated is: 50V

10. The tolerance of capacitor value, not specifically designated is: $\pm 10\%$

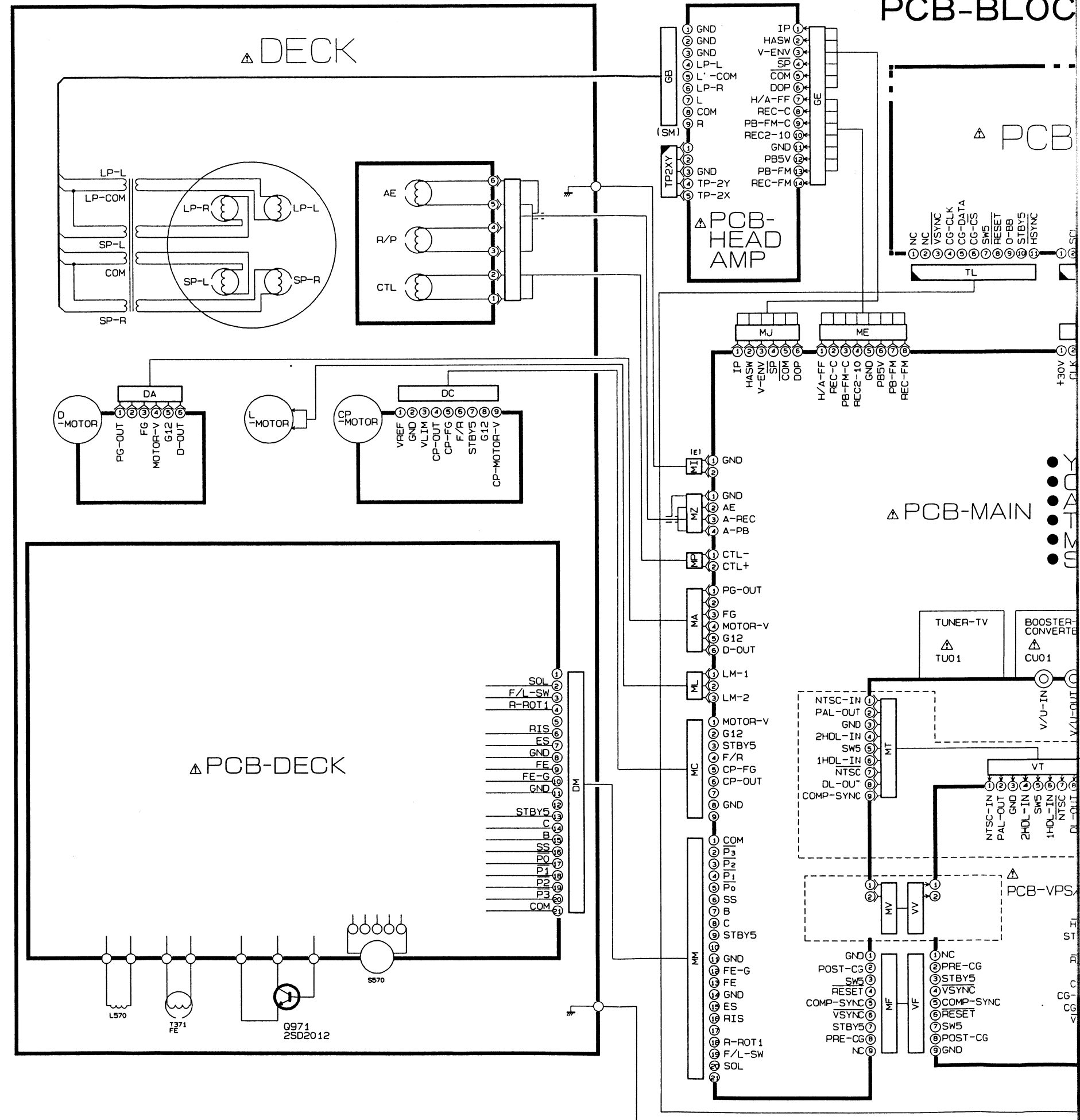
- and J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ P = $\pm 100\%$
N = $\pm 30\%$

- C = $\pm 0.25PF$ D = $\pm 0.5PF$ F = $\pm 1PF$ Z = $\pm 80\%$
N = $\pm 30\%$

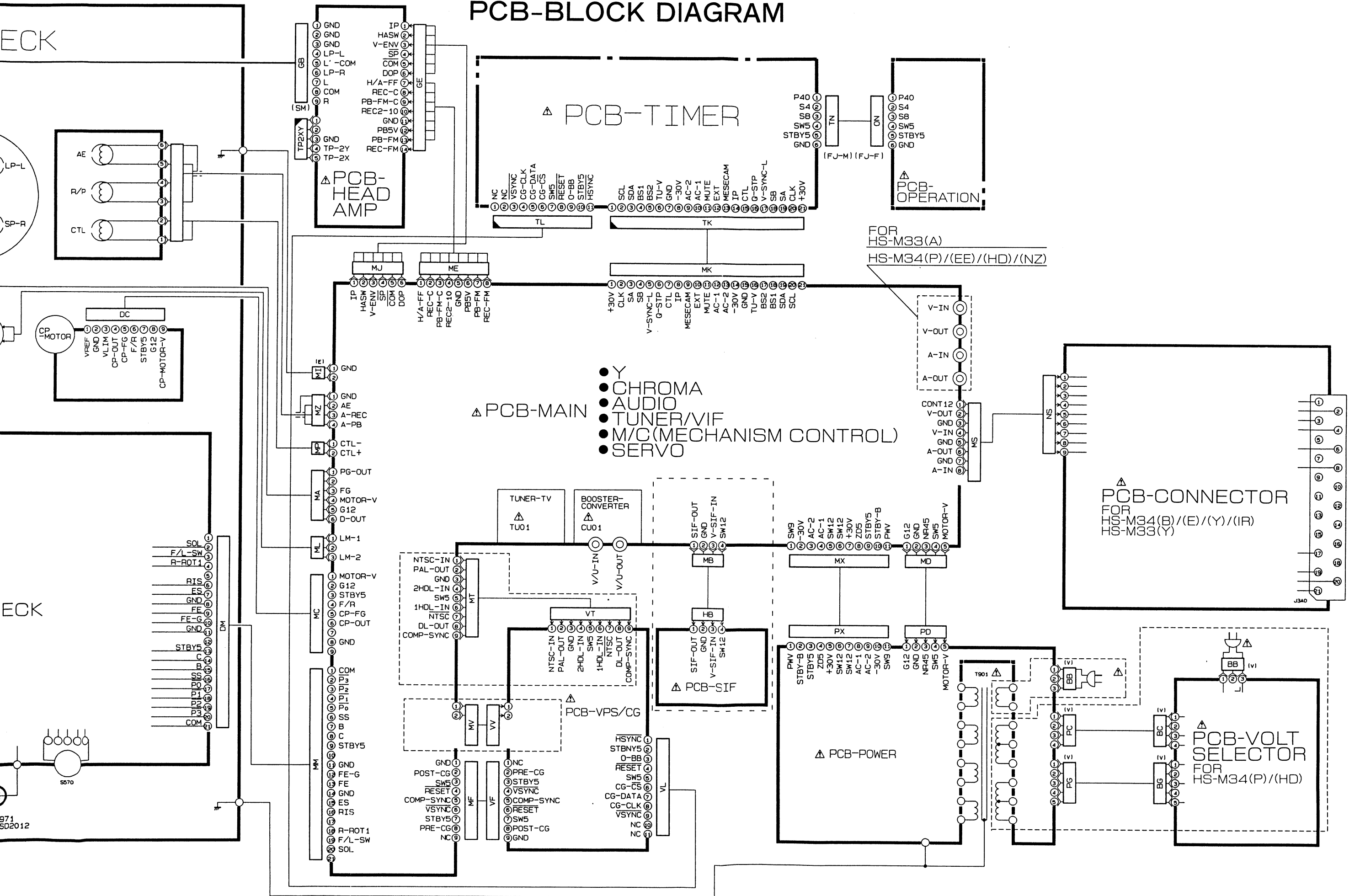
11. Ceramic capacitors with the marks RH, UJ, SL, etc. are temperature compensating types.

SPECIFIC SYMBOL			
	Zener Diode		Crystal unit
	Varicap		LE Diode
	Posistor		Photo Diode
	Thermistor		Ceramic filter
	Fusible Resistor		
	PNP DIGITAL TRANSISTOR		
	NPN DIGITAL TRANSISTOR		

This is a basic schematic diagram. Some sets may be subject to modification according to engineering improvement.



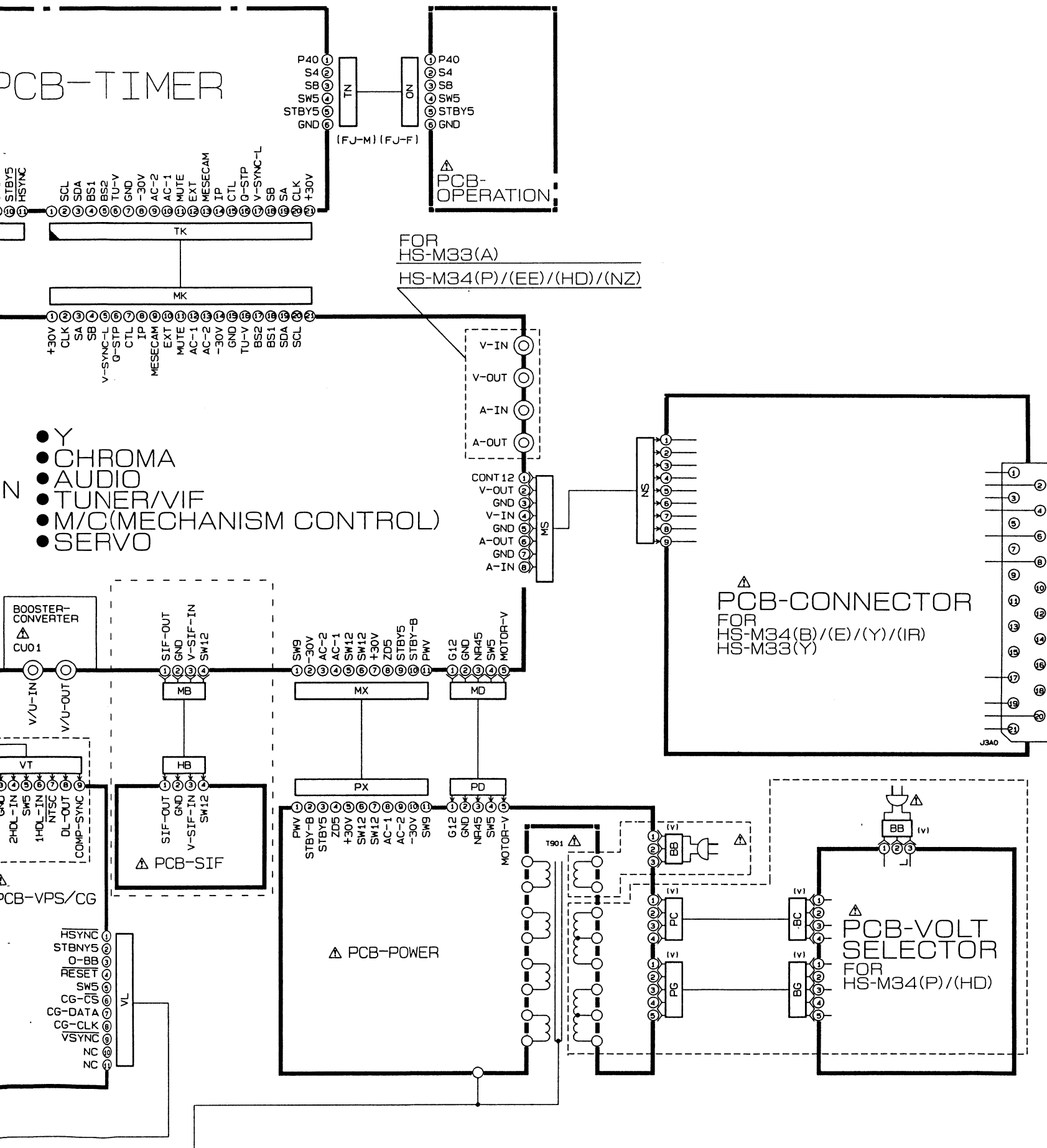
ECK



ECK

971
SD2012

LOCK DIAGRAM



HS-M33(A)/(Y)
HS-M34(B)/(E)/(EE)/(HD)
HS-M34(IR)/(NZ)/(P)/(Y) (1/5)

A

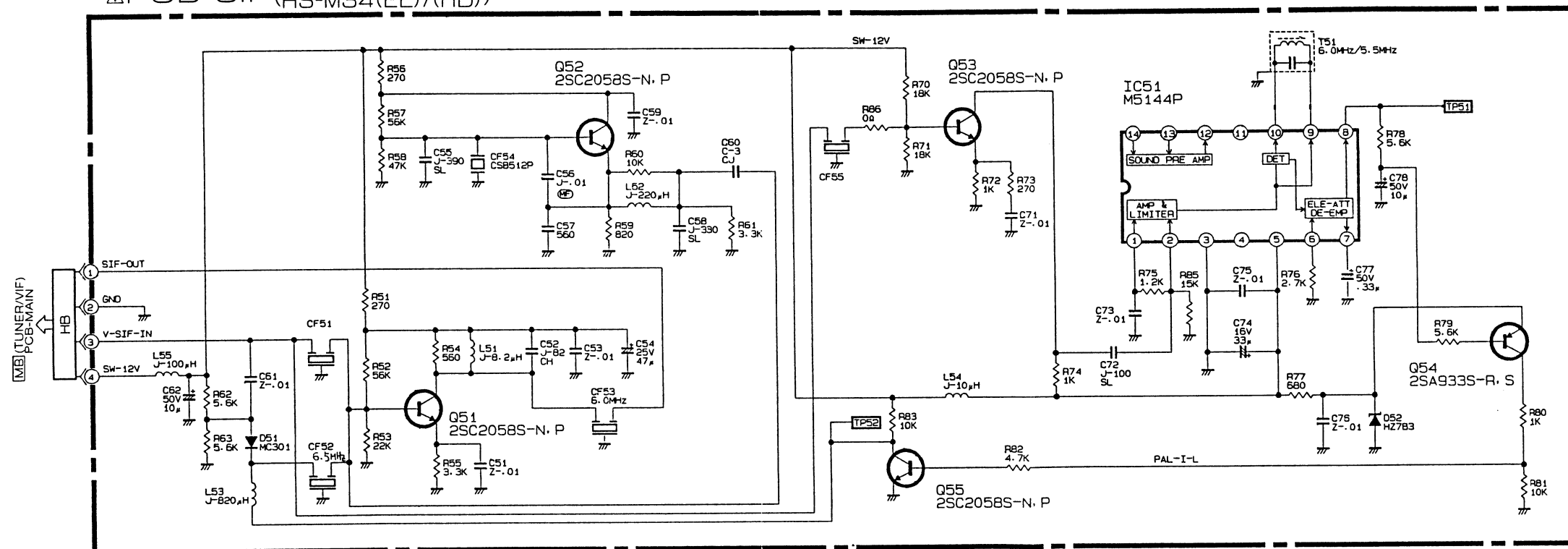
B

C

D

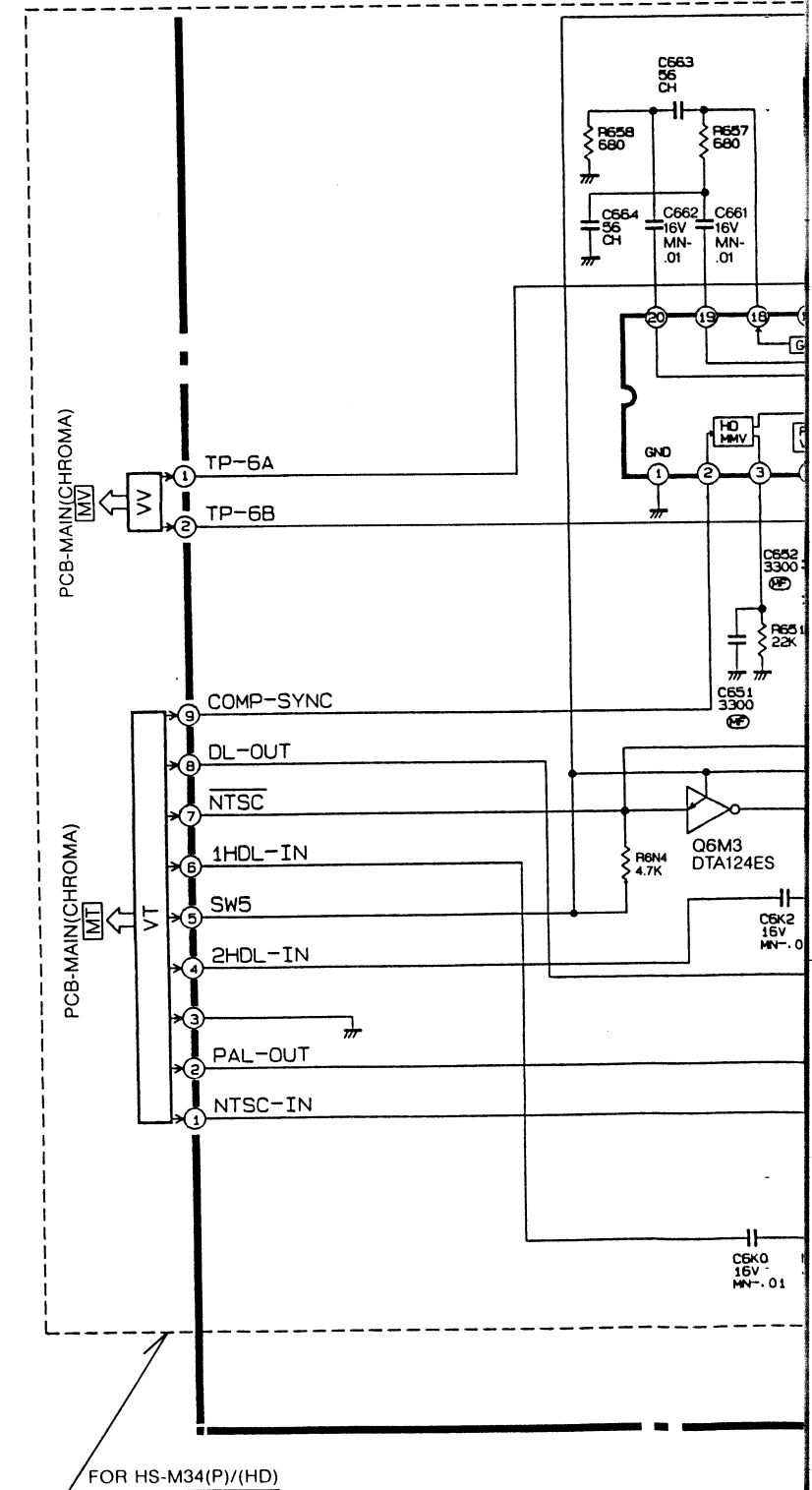
E

PCB-SIF (FOR HS-M34 (EE)/(HD))



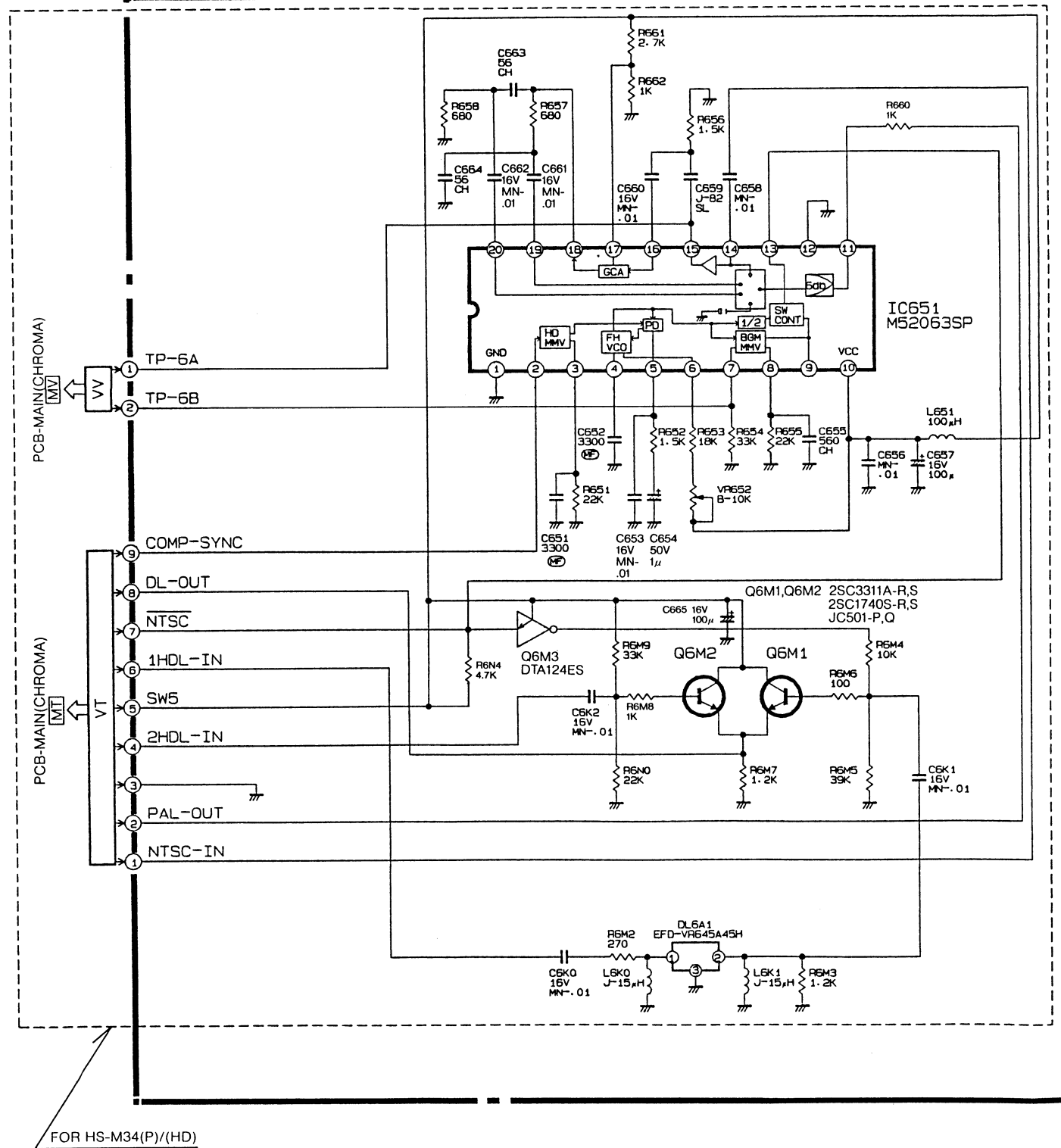
SYMBOL NO.	CF51	CF55
HS-M34 (EE)	5.5MHz	5.5MHz
HS-M34 (HD)	6MHz	6MHz

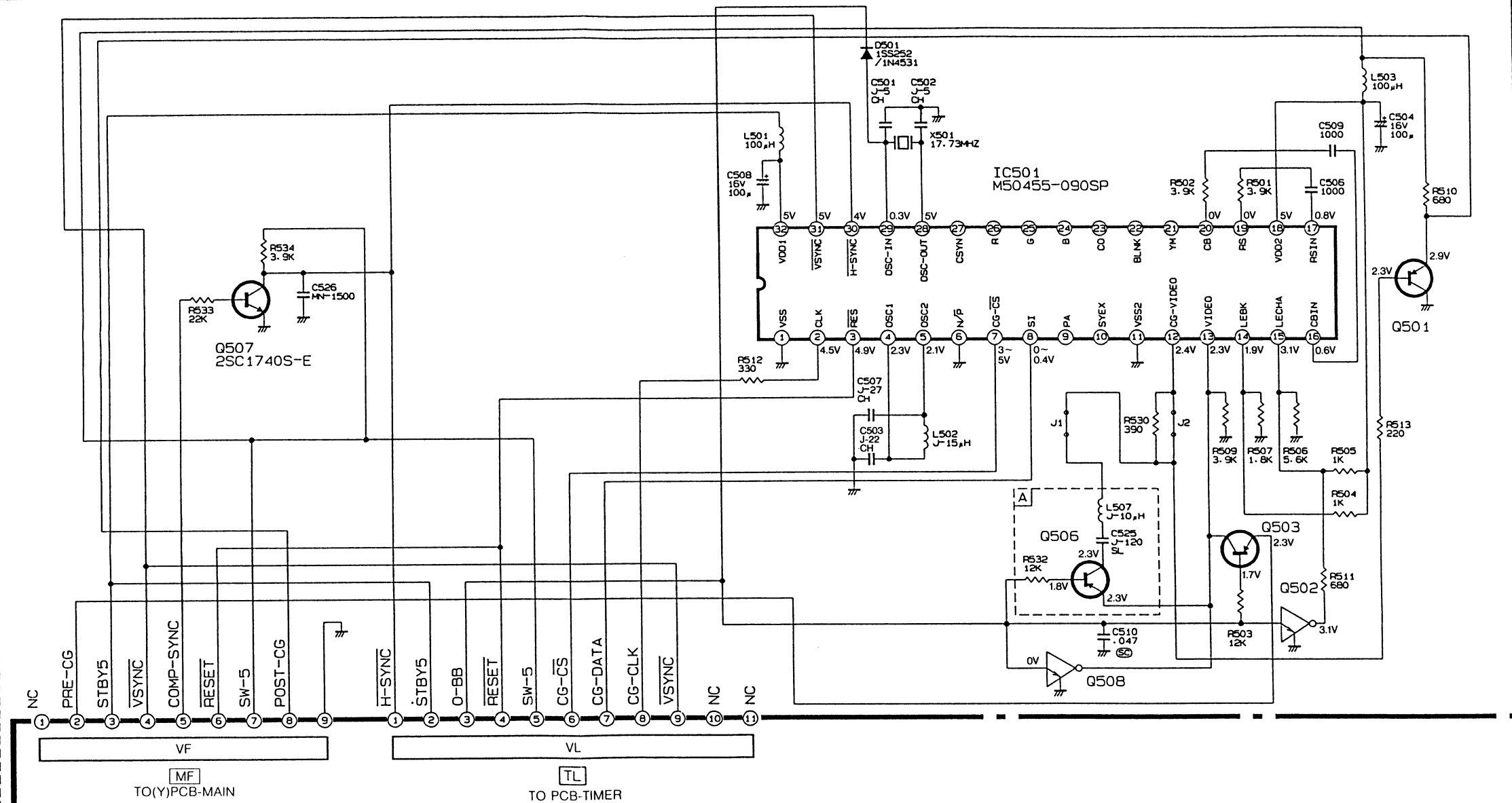
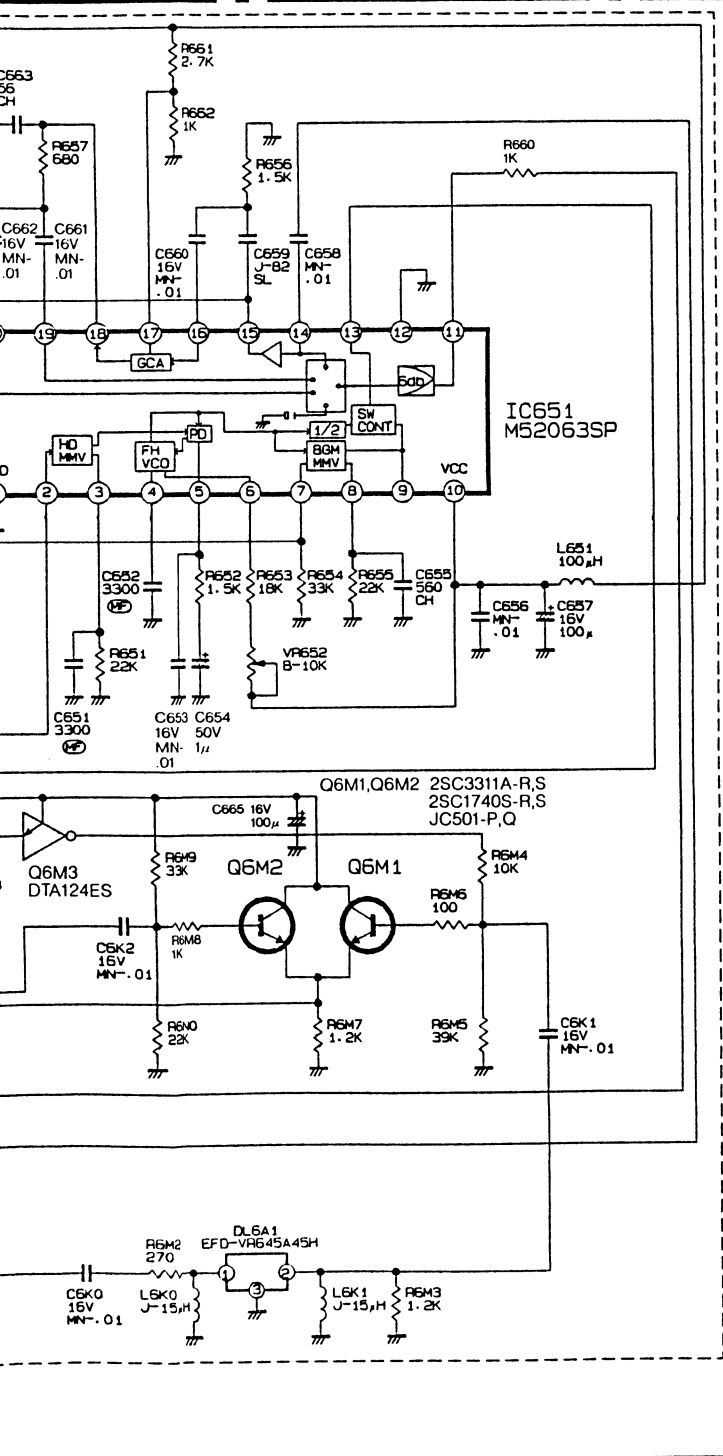
PCB-NT/VPS/CG



FOR HS-M34(P)/(HD)

⚠ PCB-NT/VPS/CG

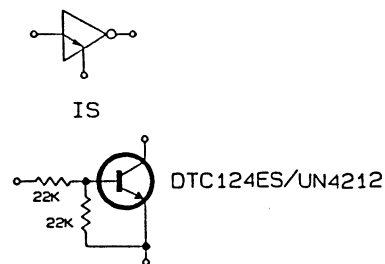


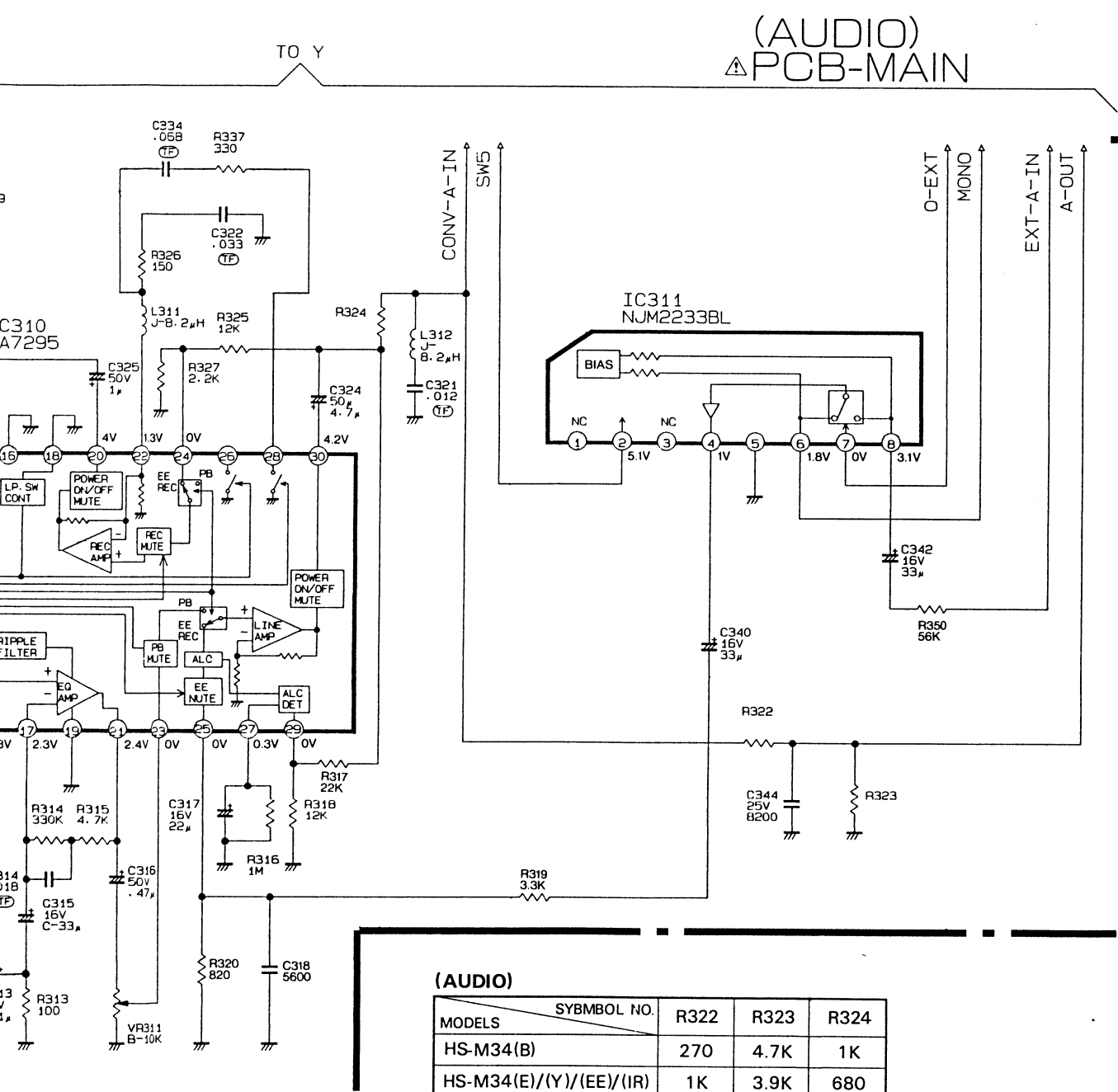


All PNP transistors are 2SA933S-R, S/2SA1309A-R, S/JA101-P, Q unless otherwise specified.

O: Employed
X: Not employed

MODELS	SYMBOL NO.	A	AREA	R530	J2
HS-M34(B)/(IR)/(NZ)		X	X	X	O
HS-M34(E)/(P)/(EE)/(HD)/(Y)		O	O	O	X
HS-M33(A)		X	X	X	O
HS-M33(Y)		O	O	O	X





10

11

12

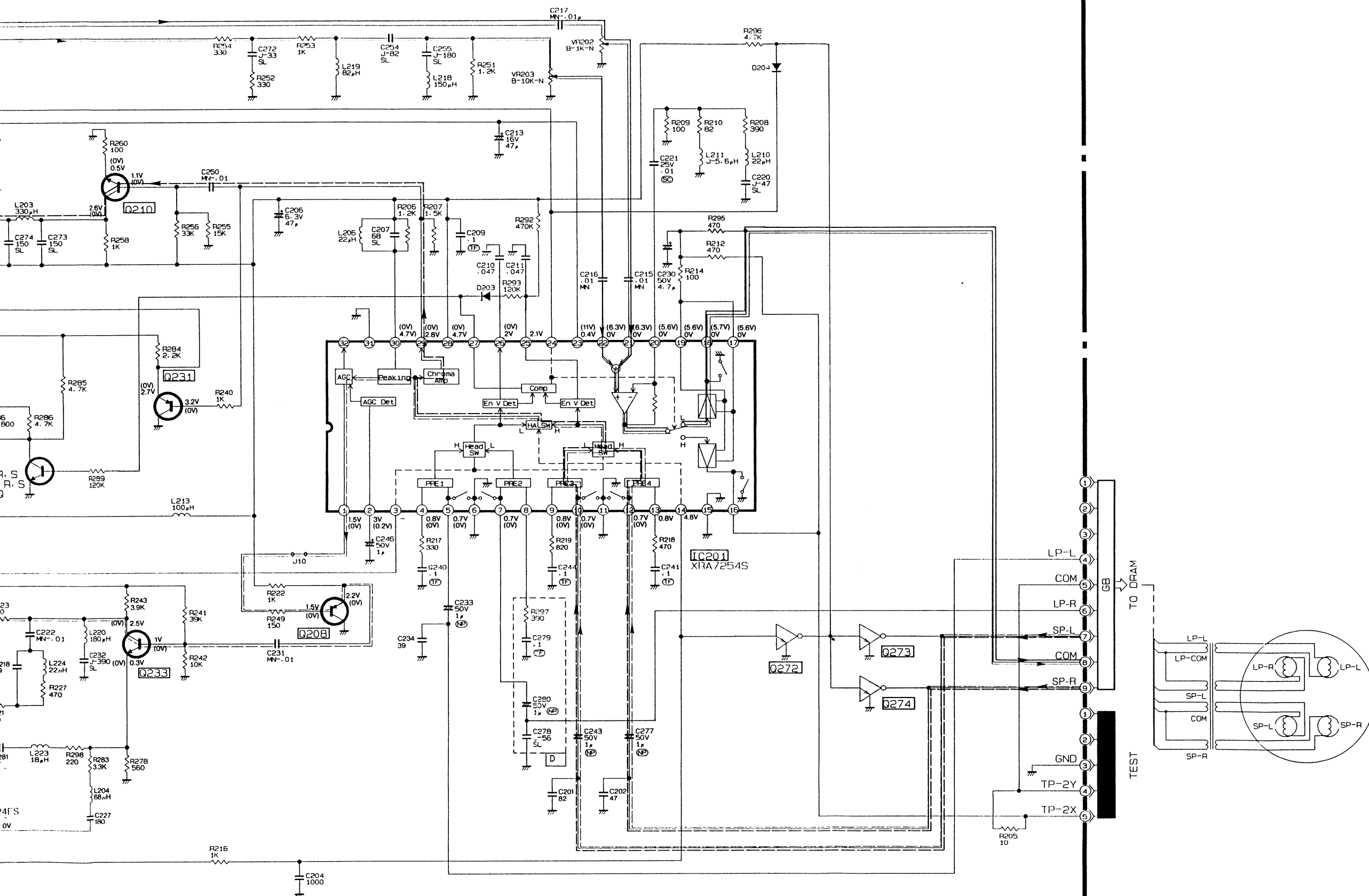
13

14

15

16

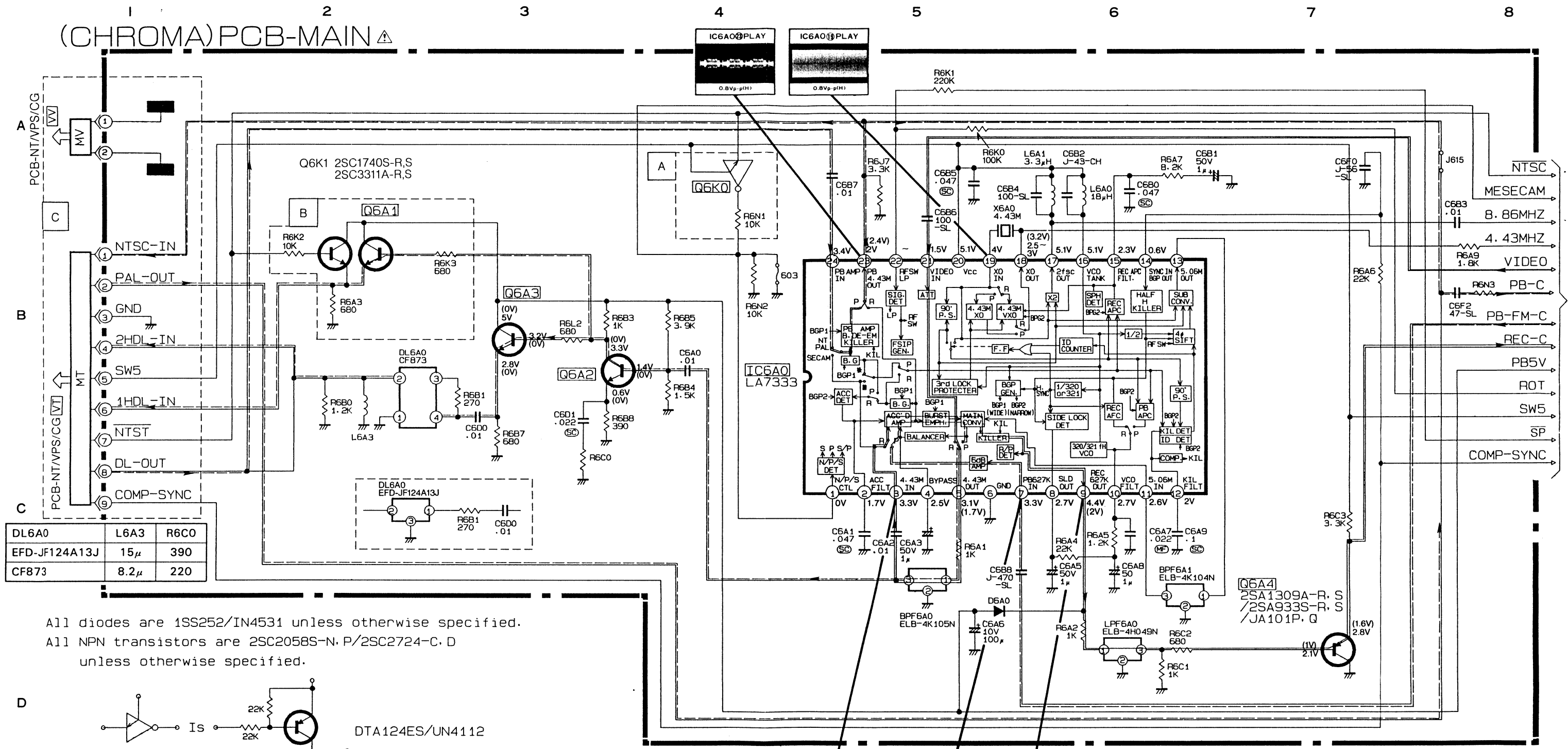
Δ PCB-HEAD AMP



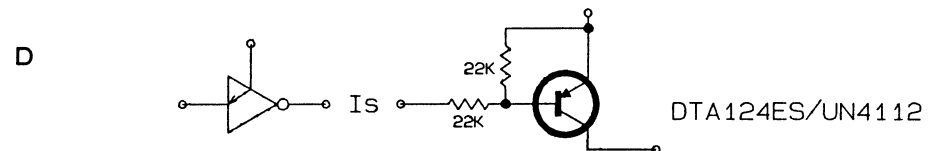
HS-M33(A)/(Y)
 HS-M34(B)/(E)/(EE)/(HD)
 HS-M34(IR)/(NZ)/(P)/(Y) (2/5)

unless otherwise specified.
 309A-R, S/JA101-P, Q unless otherwise specified.

(CHROMA) PCB-MAIN

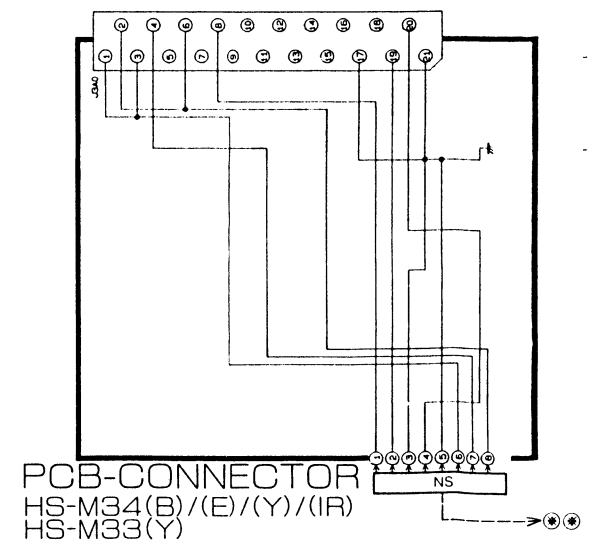


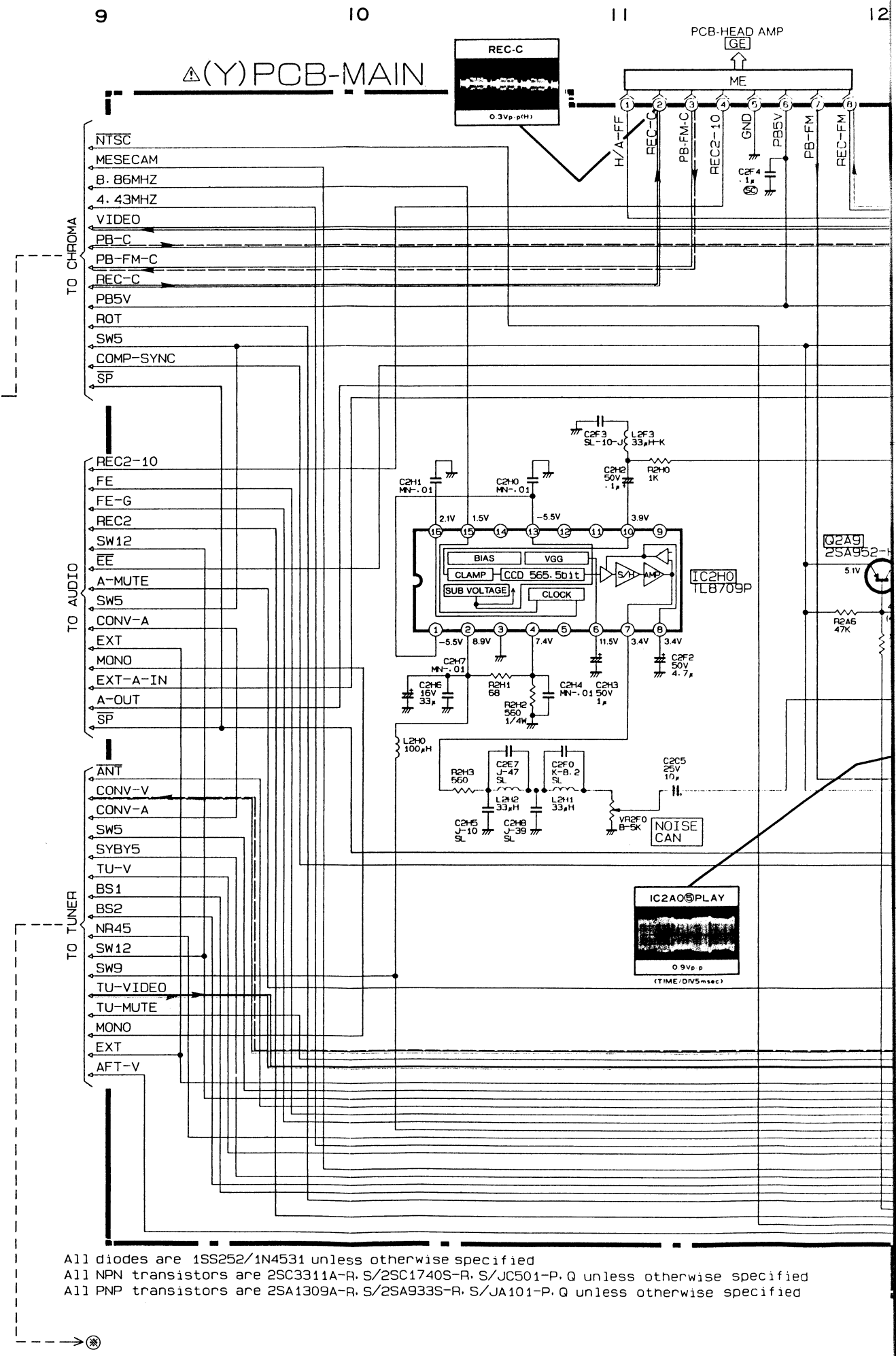
All diodes are 1SS252/IN4531 unless otherwise specified.
All NPN transistors are 2SC2058S-N,P/2SC2724-C,D
unless otherwise specified.

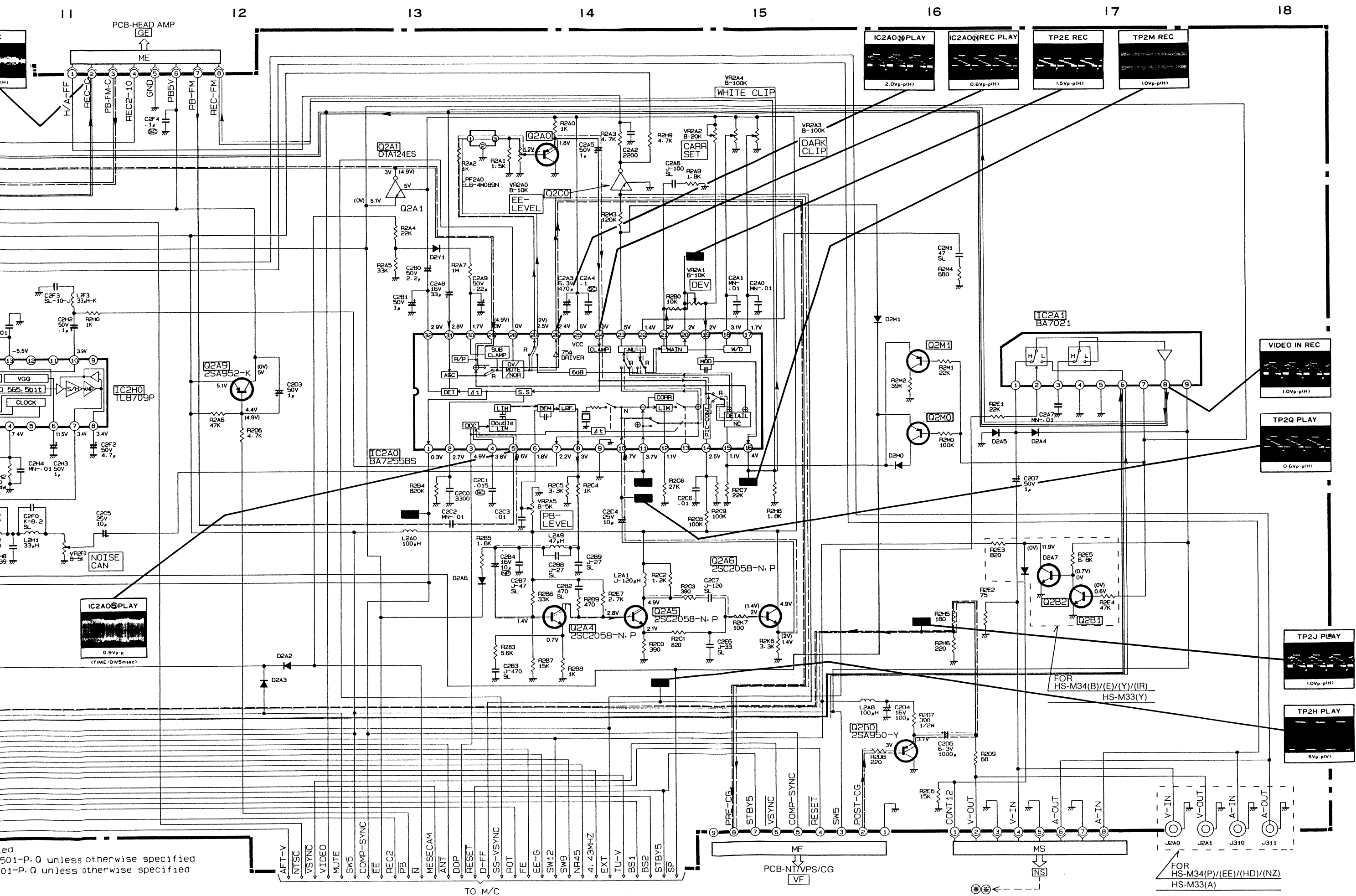


(CHROMA)							
SYMBOL NO.	A AREA	B AREA	C AREA	R6N2	R6N3	J603	J615
HS-M34(P)/(HD)	○	○	○	○	3.3K	×	×
HS-M34(B)/(IR)/(NZ)	×	×	×	×	2.7K	○	○
HS-M34(E)/(Y)/(EE)	×	×	×	○	2.7K	×	○
HS-M33(A)	×	×	×	×	3.3K	○	○
HS-M33(Y)	×	×	×	○	2.7K	×	○

_____	Recording of Luminance Signal
-----	Playback of Luminance Signal
_____	Recording of Color Signal
-----	Playback of Color Signal







(TUNER/VIF) PCB-MAIN

HS-M33(A)/(Y)
HS-M34(B)/(E)/(IR)/(NZ)/(P)/(Y)

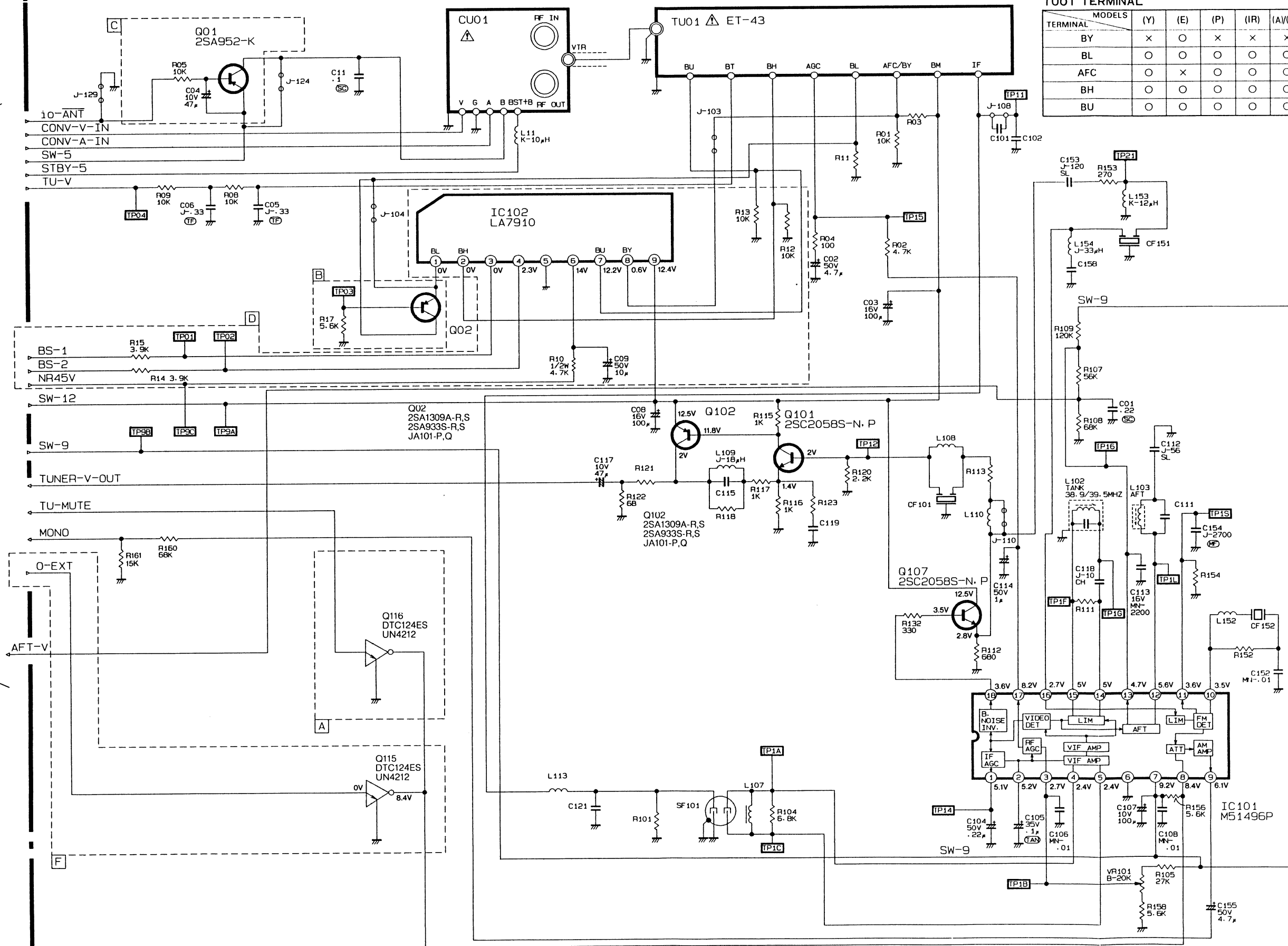
A

B

C

D

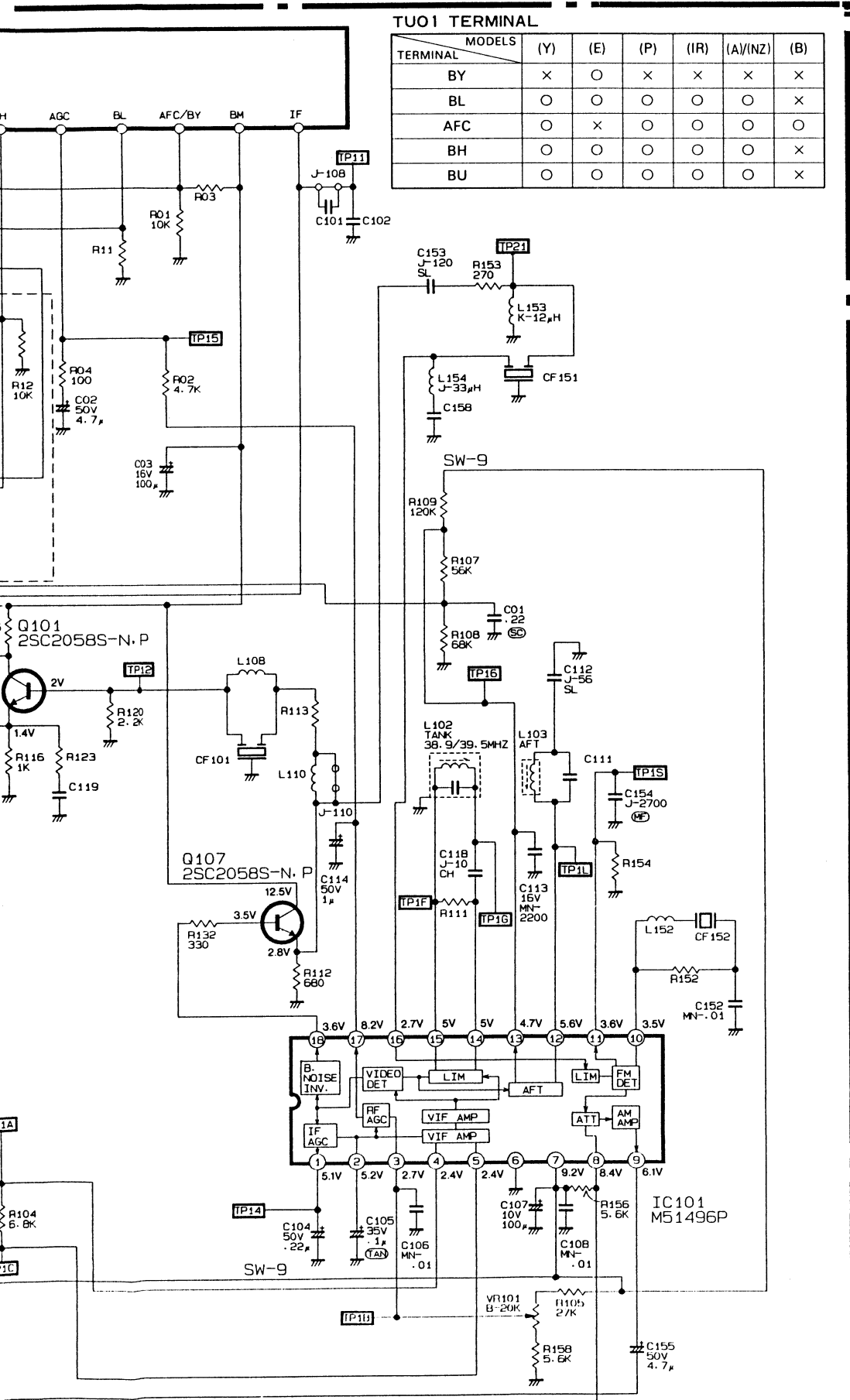
E



TU01 TERMINAL

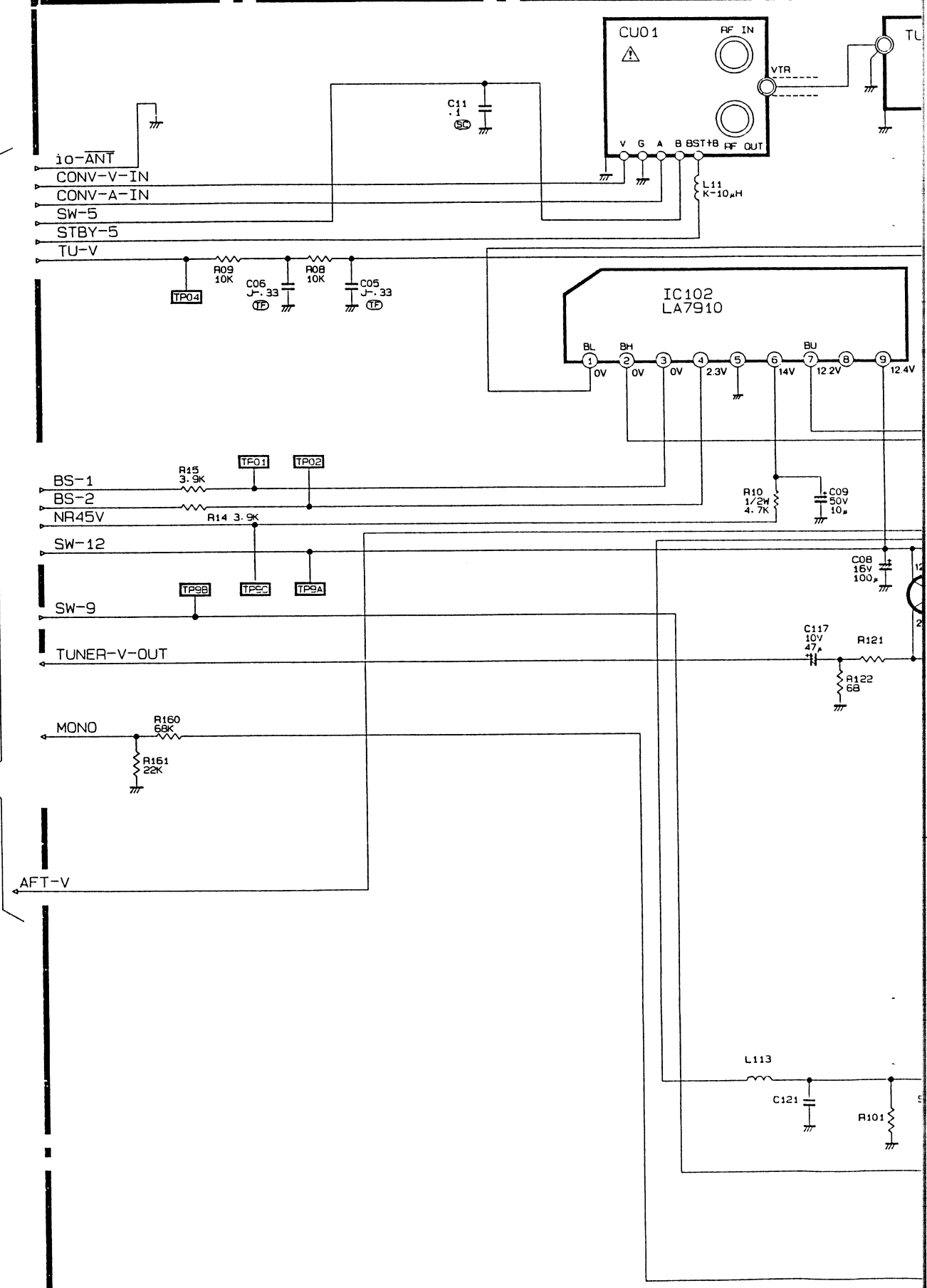
TERMINAL	MODELS	(Y)	(E)	(P)	(IR)	(A)/(NZ)	(B)
BY		x	o	x	x	x	x
BL		o	o	o	o	o	x
AFC		o	x	o	o	o	o
BH		o	o	o	o	o	x
BU		o	o	o	o	o	x

MODEL	M33(Y)	M34(E)	M34(P)
A AREA	o	o	o
B AREA	x	o	o
C AREA	x	x	o
D AREA	o	o	o
F AREA	x	x	o
J-103	x	o	o
J-104	o	x	o
J-108	x	x	o
J-110	x	o	o
J-124	o	o	o
J-129	o	o	o
C101	J-47SL	J-47SL	J-47SL
C102	J-47SL	J-47SL	J-47SL
C111	J-68RH	J-68RH	J-68RH
C115	J-39SL	J-39SL	J-39SL
C119	J-82SL	x	J-82SL
C121	J-10P CH	C-8PCH	C-8PCH
C158	J-100 SL	J-100 SL	J-100 SL
CF 101	5.5/5.74/5.5	5.5/5.74/5.5	5.5/5.74/5.5
CF 151	5.5MHZ	5.5MHZ	5.5MHZ
CF 152	5.5MHZ	5.5MHZ	5.5MHZ
L107	K-2.2uH SHIELD	K-1.8uH SHIELD	K-2.2uH SHIELD
L108	J-5.6uH	J-10uH	J-5.6uH
L110	3.3uH	x	3.3uH
L113	J-1.5uH	J-1.5uH	J-1.5uH
L152	J-47uH	J-47uH	J-47uH
R03	18K	x	18K
R11	10K	10K	10K
R101	1.8K-F	3.9K-F	2.7K-F
R111	6.8K	6.8K	2.7K
R113	220	360-F	820
R118	3.3K	1.2K	820
R121	150	120	150
R123	470	x	1.5K
R152	5.6K	5.6K	5.6K
R154	47K	47K	47K

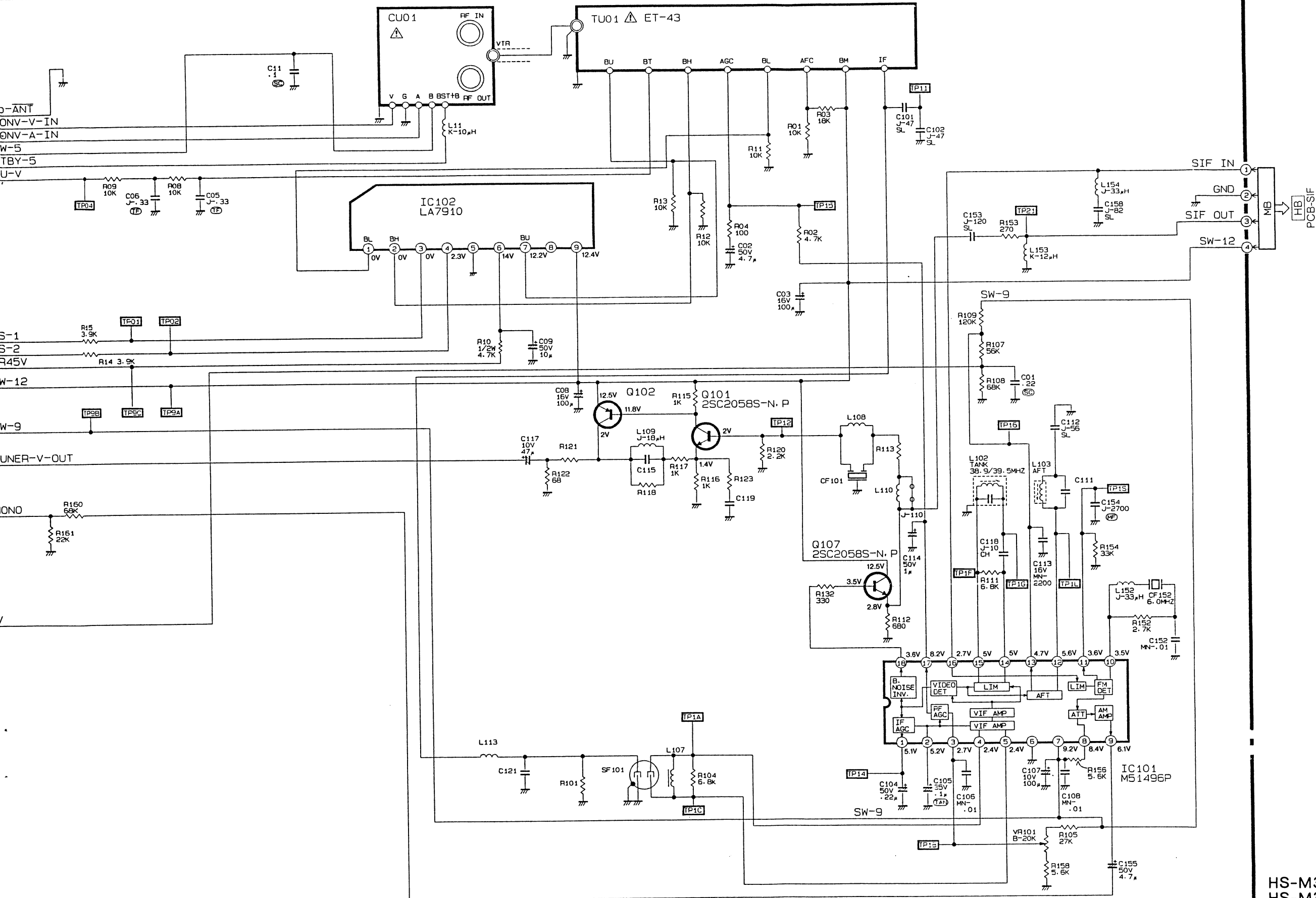


O: Employed X: Not employed

MODELS SYMBOL NO.	M33(Y) M34(Y)	M34(E)	M34(P)	M34(IR)	M34(NZ)	M34(B)	M33(A)
A AREA	O	O	X	X	X	X	X
B AREA	X	O	X	X	X	X	X
C AREA	X	X	X	X	O	X	O
D AREA	O	O	O	O	O	X	O
F AREA	X	X	X	X	X	X	X
J-103	X	O	X	X	X	X	X
J-104	O	X	O	O	O	X	O
J-108	X	X	O	X	O	X	O
J-110	X	O	O	O	O	O	O
J-124	O	O	O	O	X	O	X
J-129	O	O	O	O	X	O	X
C101	J-47SL	J-47SL	X	J-47SL	X	J-47SL	X
C102	J-47SL	J-47SL	J-33SL	J-47SL	J-33SL	J-47SL	X
C111	J-68RH	J-68RH	J-68RH	J-68RH	J-68RH	J-68RH	J-82RH
C115	J-39SL	J-39SL	J-47SL	J-33SL	J-47SL	J-33SL	J-39SL
C119	J-82SL	X	J-120 SL	J-82SL	J-120 SL	J-47SL	J-47SL
C121	J-10P CH	C-8PCH	C-3PCH	C-4PCH	C-3PCH	C-8PCH	C-8PCH
C158	J-100 SL	J-100 SL	J-100 SL	J-82SL	J-100 SL	J-82SL	J-100 SL
CF101	5.5/ 5.74/6.5	5.5/ 5.74/6.5	5.5MHZ	6.0MHZ	5.5MHZ	6.0MHZ	5.5/ 5.74MHZ
CF151	5.5MHZ	5.5MHZ	5.5MHZ	6.0MHZ	5.5MHZ	6.0MHZ	5.5MHZ
CF152	5.5MHZ	5.5MHZ	5.5MHZ	6.0MHZ	5.5MHZ	6.0MHZ	5.5MHZ
L107	K-2.2H SHIELD	K-1.8H SHIELD	K-2.2H SHIELD	K-2.2H SHIELD	K-2.2H SHIELD	K-1.8H SHIELD	K-1.8H SHIELD
L108	J-5.6H	J-10H	J-15H	J-12H	J-15H	J-12H	J-10H
L110	3.3H	X	X	X	X	X	X
L113	J-1.5H	J-1.5H	J-1.8H	J-1.5H	J-1.8H	J-1.2H	J-1.5H
L152	J-47H	J-47H	J-47H	J-33H	J-47H	J-33H	J-47H
R03	18K	X	18K	18K	18K	18K	18K
R11	10K	10K	10K	10K	10K	X	10K
R101	1.8K-F	3.9K-F	2.7K-F	1.5K-F	2.7K-F	1.5K-F	2.2K-F
R111	6.8K	6.8K	2.2K	6.8K	2.2K	6.8K	6.8K
R113	220	360-F	820	680	820	820	270
R118	3.3K	1.2K	820	3.9K	820	3.9K	3.3K
R121	150	120	120	150	120	120	150
R123	470	X	1.5K	470	1.5K	1.5K	2.7K
R152	5.6K	5.6K	5.6K	2.7K	5.6K	2.7K	5.6K
R154	47K	47K	47K	82K	47K	82K	47K

(TUNER/VIF) PCB-MAIN Δ HS-M34(HD)/(EE)

TUNER/VIF) PCB-MAIN △ HS-M34(HD)/(EE)



1

2

3

4

5

6

7

(M/C)PCB-MAIN

A

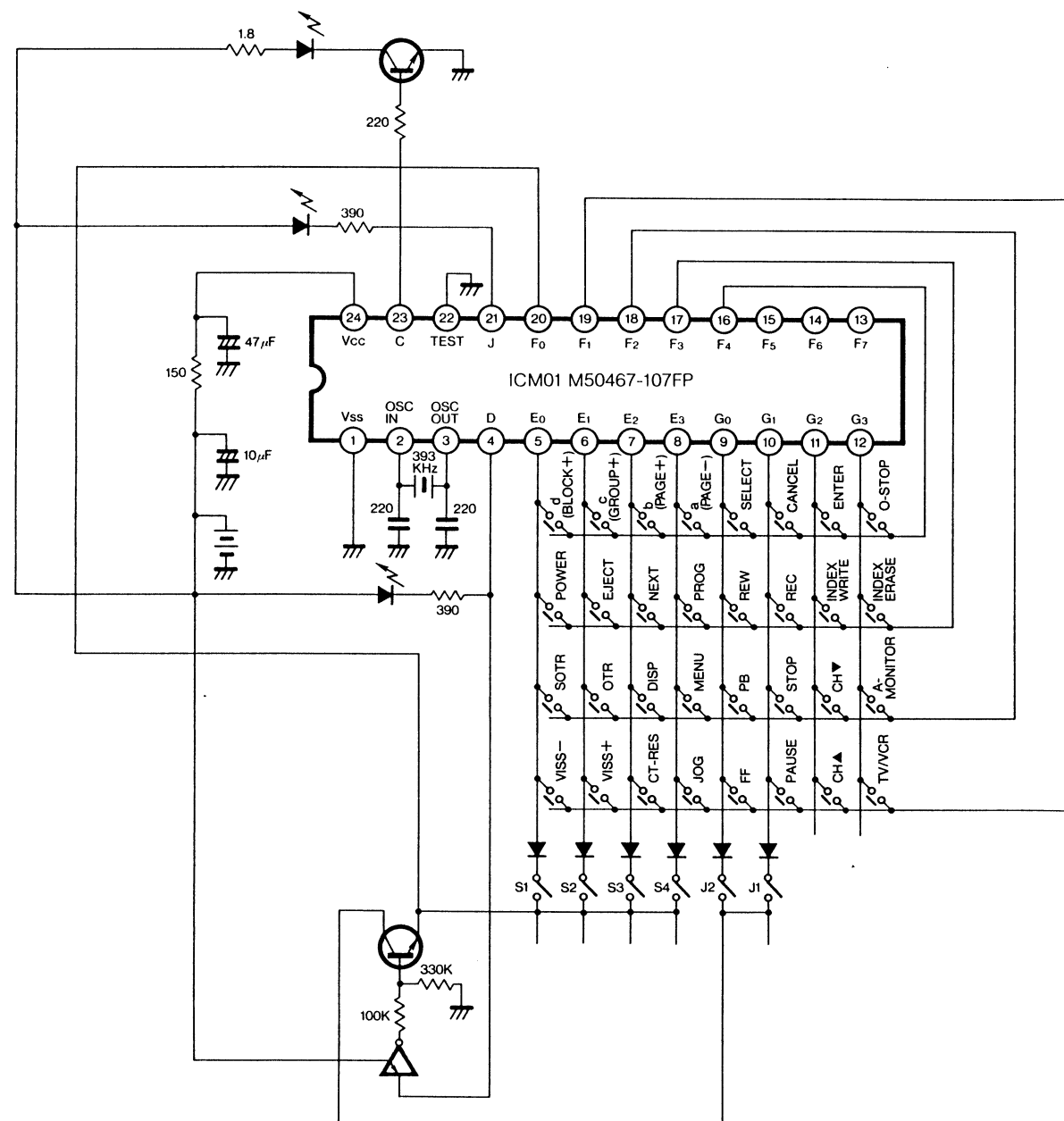
TRANSMITTER REMOTE CONTROL

B

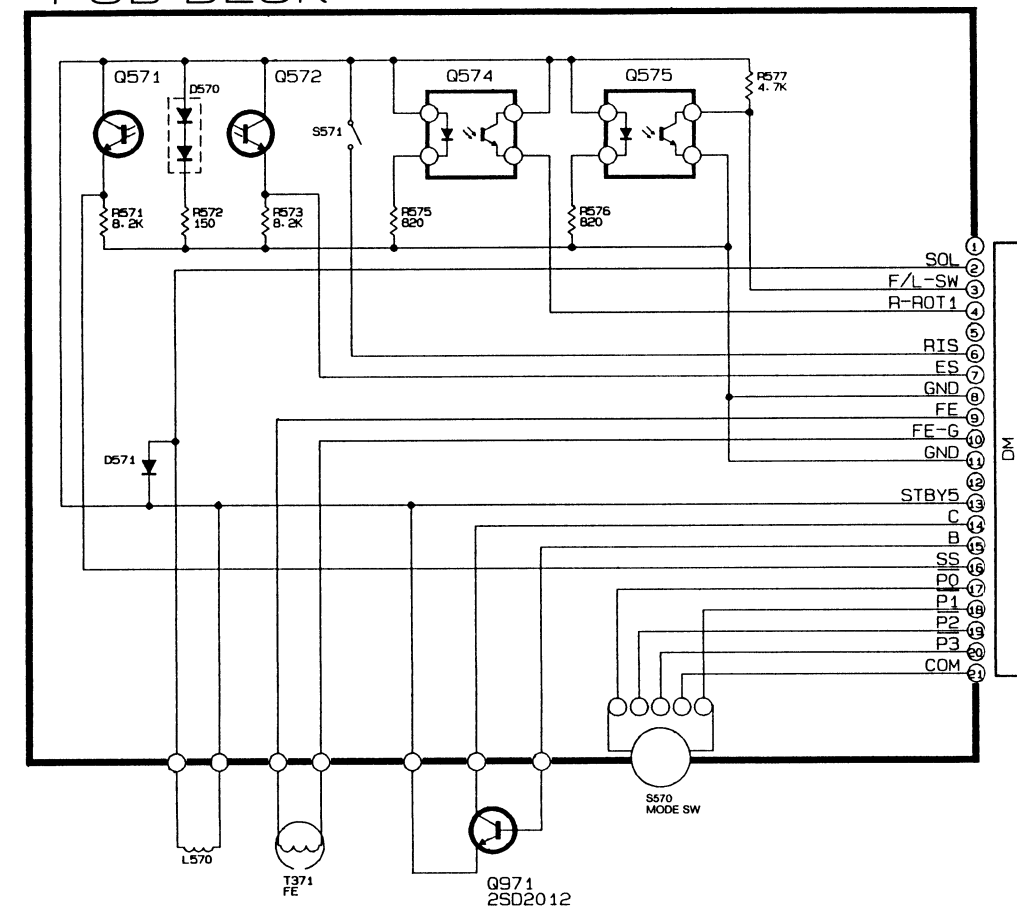
C

D

E



PCB-DECK



(M/C)

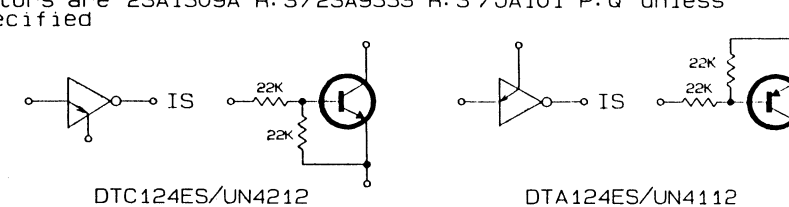
O : Employed X : Not employed

MODELS	SYMBOL NO.	J300	R5X0	J545	R5K3	R5D8
HS-M34(B)		O	X	X	O	X
HS-M34(E)/(Y)/(EE)/(IR)		X	O	O	X	X
HS-M34(P)/(HD)		X	O	O	X	X
HS-M34(NZ)		X	O	O	X	O
HS-M33(A)		X	O	O	X	O
HS-M33(Y)		X	O	O	X	X

All diodes are 1SS252/1N4531 unless otherwise specified

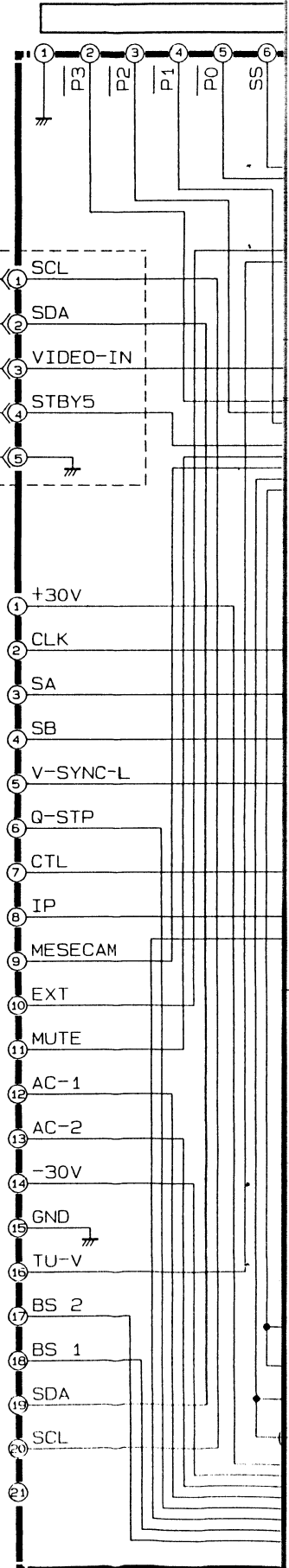
All NPN transistors are 2SC3311A-R.S/2SC1740S-R.S/JC501-P.Q unless otherwise specified

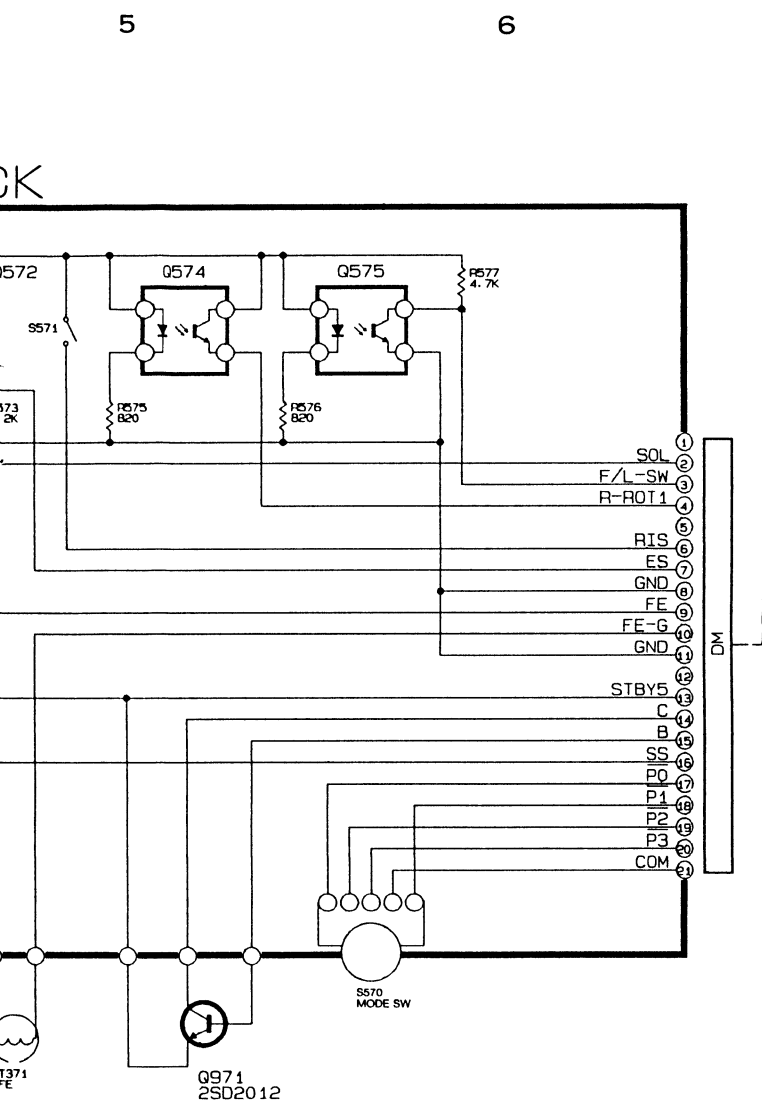
All PNP transistors are 2SA1309A-R.S/2SA933S-R.S/JA101-P.Q unless otherwise specified



PCB-TIMER(TK)

MK



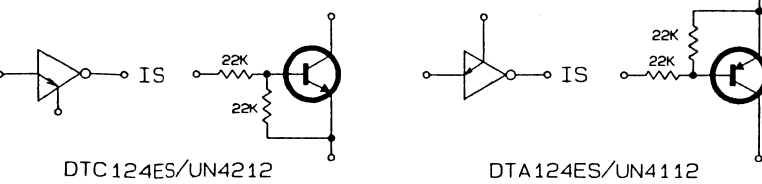


(M/C)

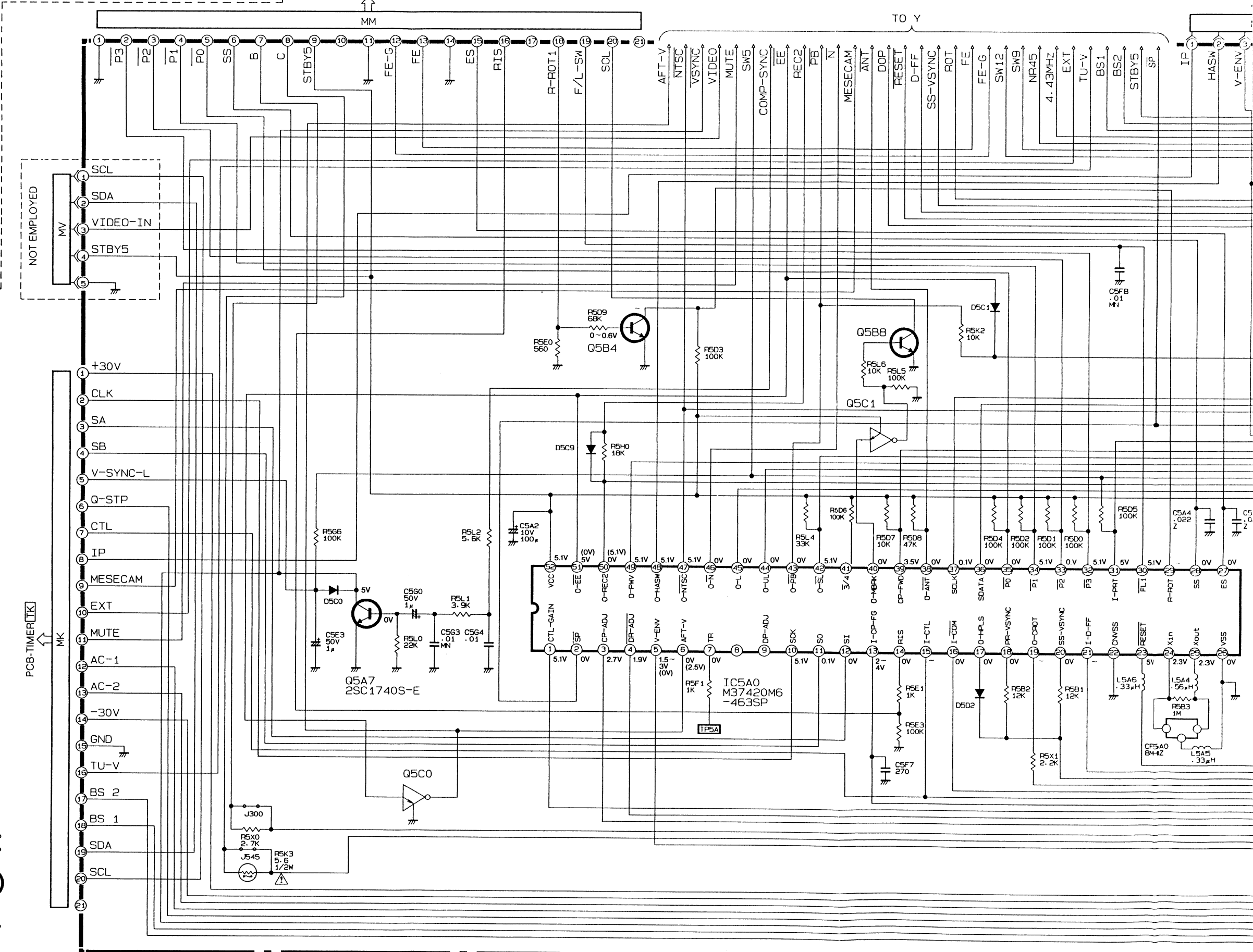
○ : Employed × : Not employed

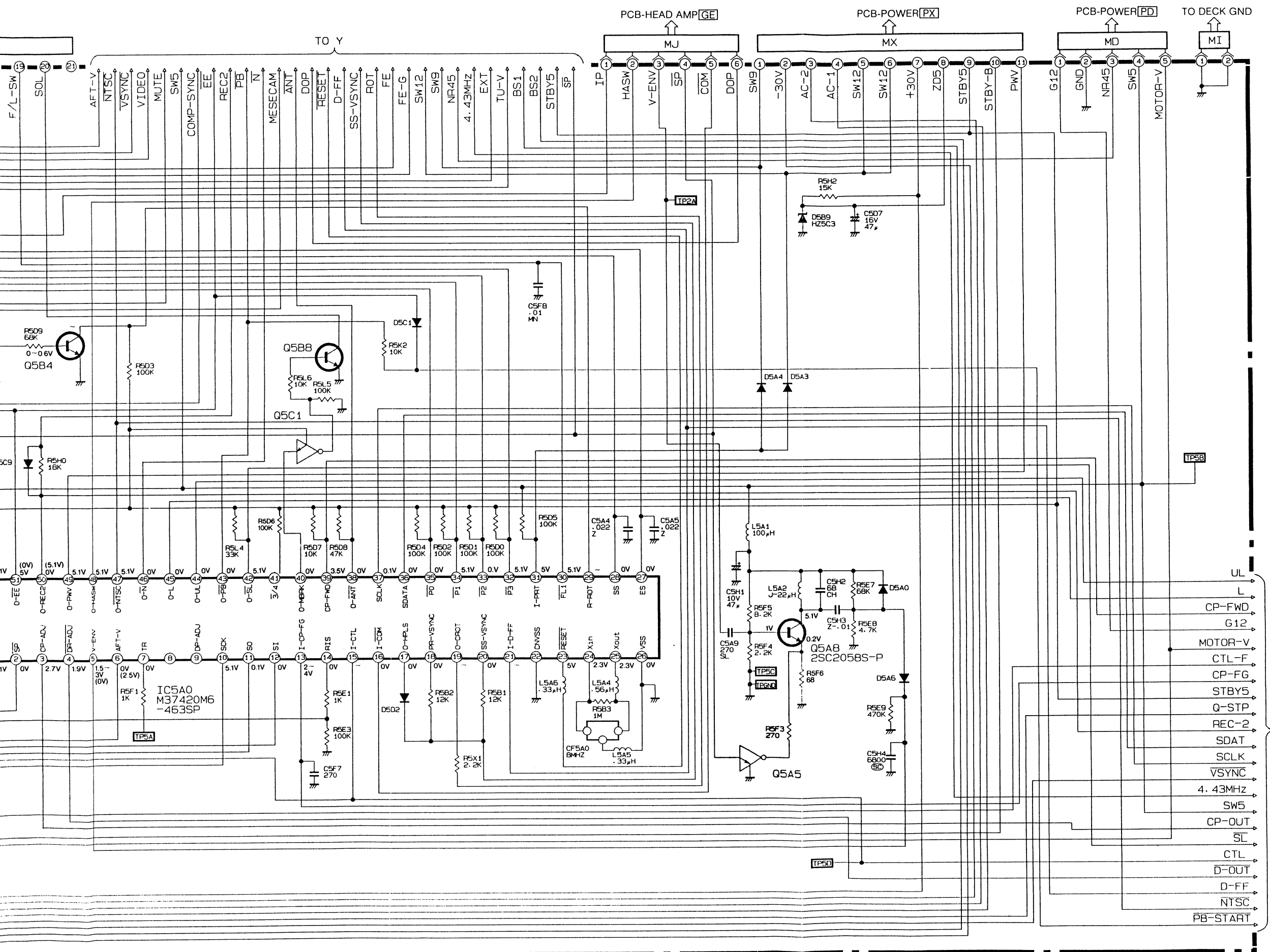
MODELS	SYMBOL NO.	J300	R5X0	J545	R5K3	R5D8
HS-M34(B)		○	×	×	○	×
HS-M34(E)/(Y)/(EE)/(IR)		×	○	○	×	×
HS-M34(P)/(HD)		×	○	○	×	×
HS-M34(NZ)		×	○	○	×	○
HS-M33(A)		×	○	○	×	○
HS-M33(Y)		×	○	○	×	×

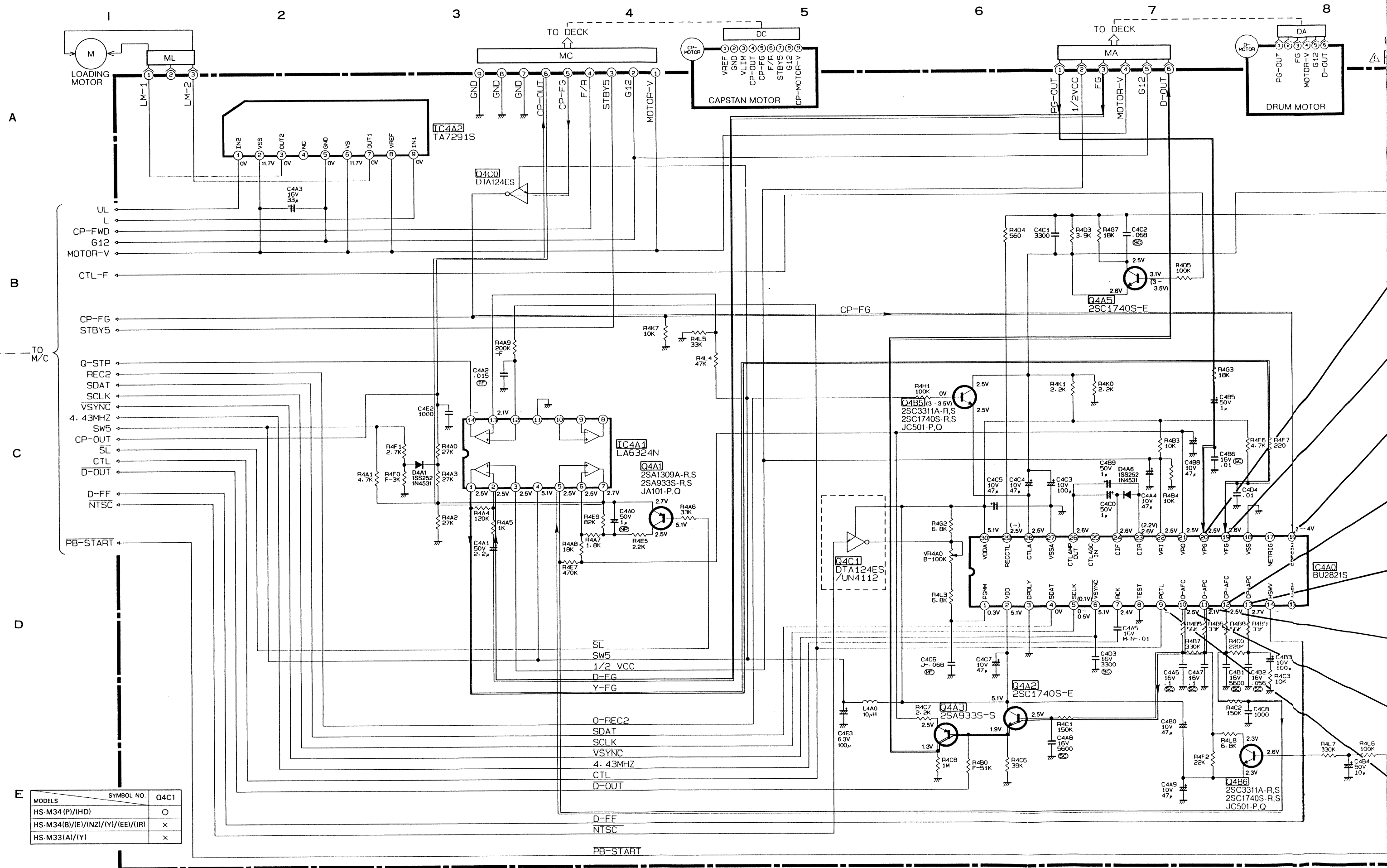
S252/1N4531 unless otherwise specified
 rs are 2SC3311A-R.S/2SC1740S-R.S/JC501-P.Q unless
 fied
 rs are 2SA1309A-R.S/2SA933S-R.S/JA101-P.Q unless
 fied

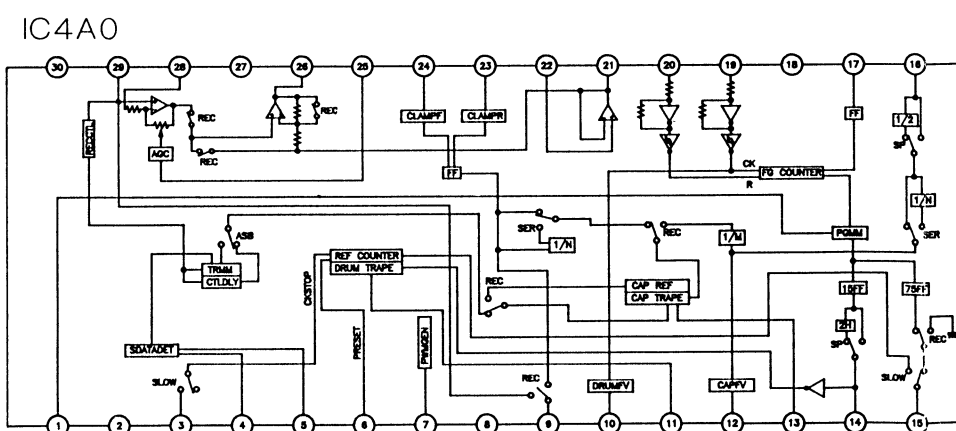
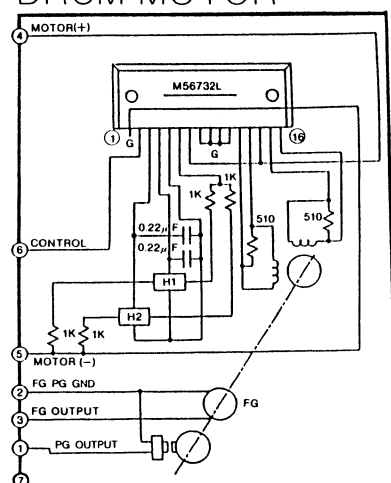
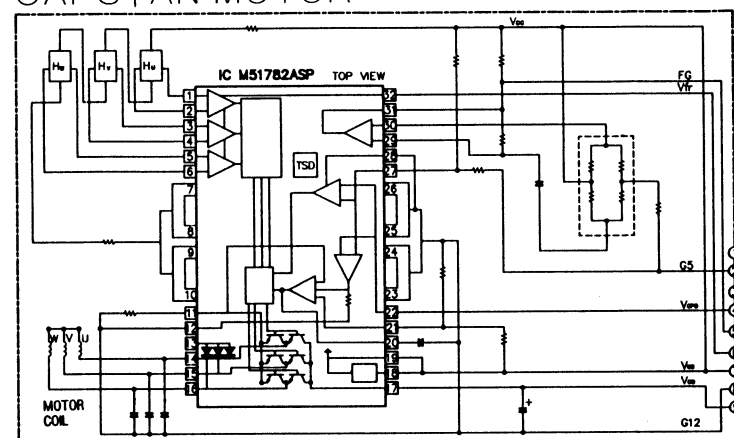
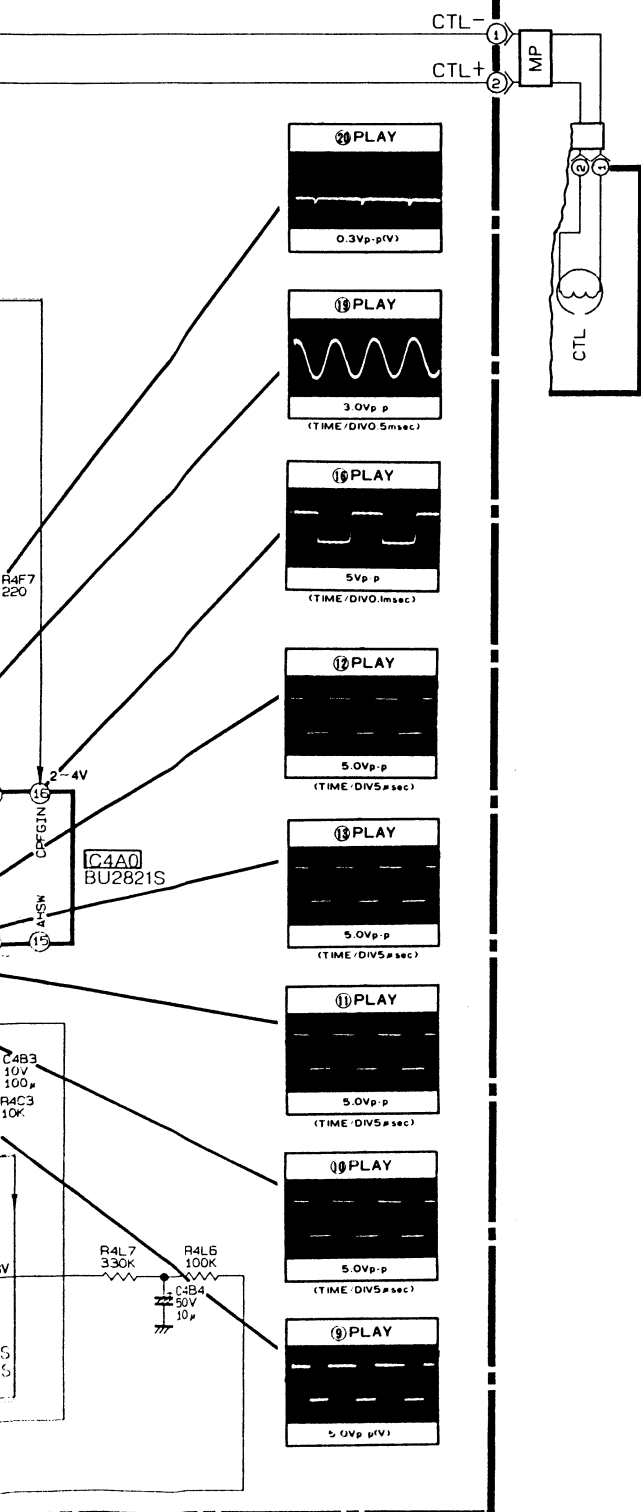


(M/C)PCB-MAIN





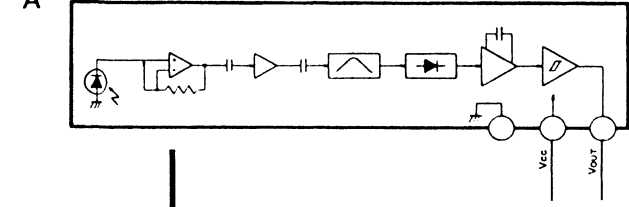




HS-M33(A)/(Y)
HS-M34(B)/(E)/(EE)/(HD)
HS-M34(IR)/(NZ)/(P)/(Y) (4/5)

PCB-TIMER

ZBA0
PREAMP-REMOTE CONTROL



B

C

D

E

TO (M/C)PCB-MAIN

TO (CG)PCB-NT/VPS/CG

All diodes are 1SS252/1N4531 unless otherwise specified
All PNP transistors are 2SA1309A-R, S/2SA933S-R, S/JA101-P, Q unless otherwise specified
All NPN transistors are 2SC3311A-R, S/2SC1740S-R, S/JC501-P, Q unless otherwise specified

4

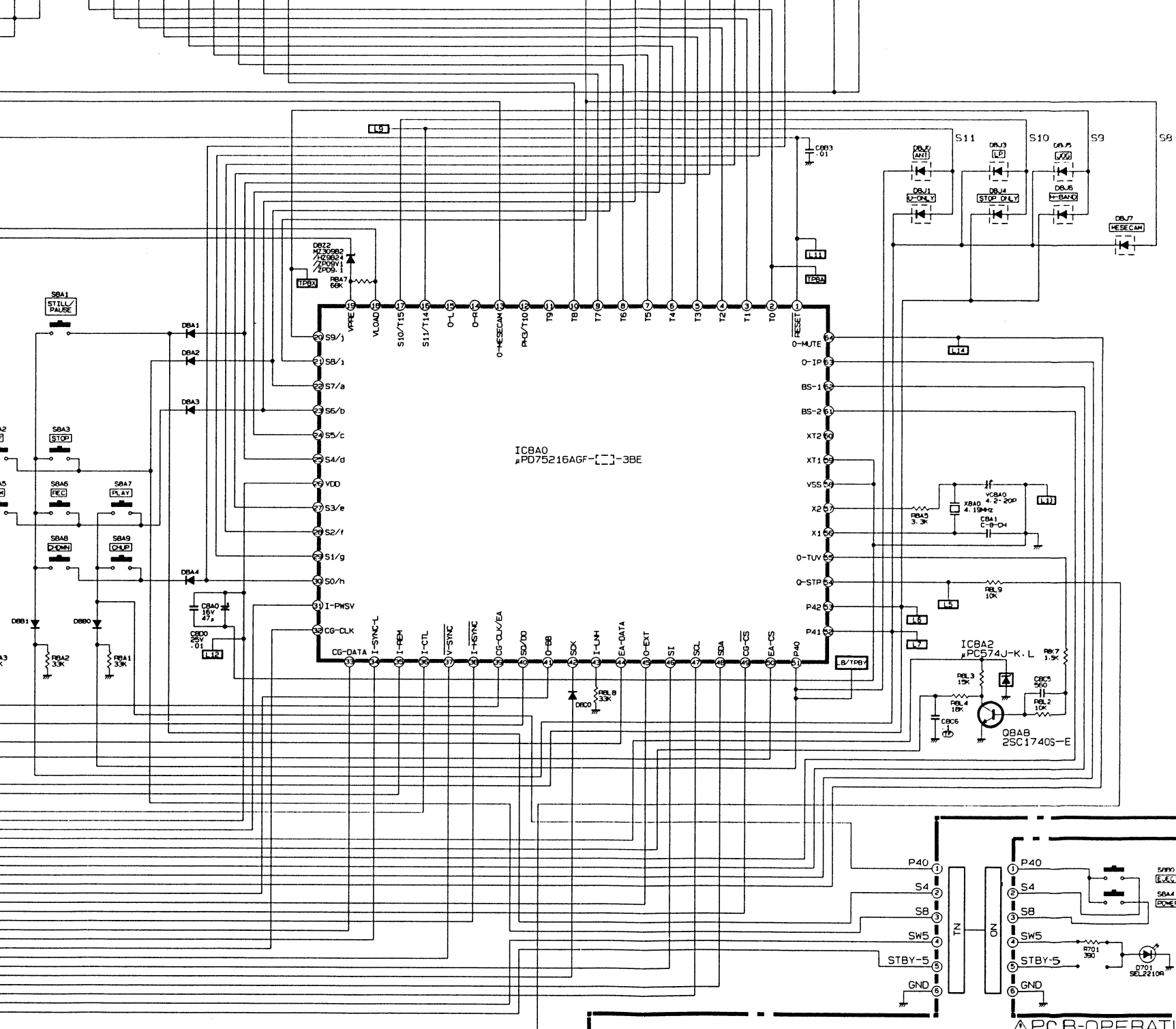
5

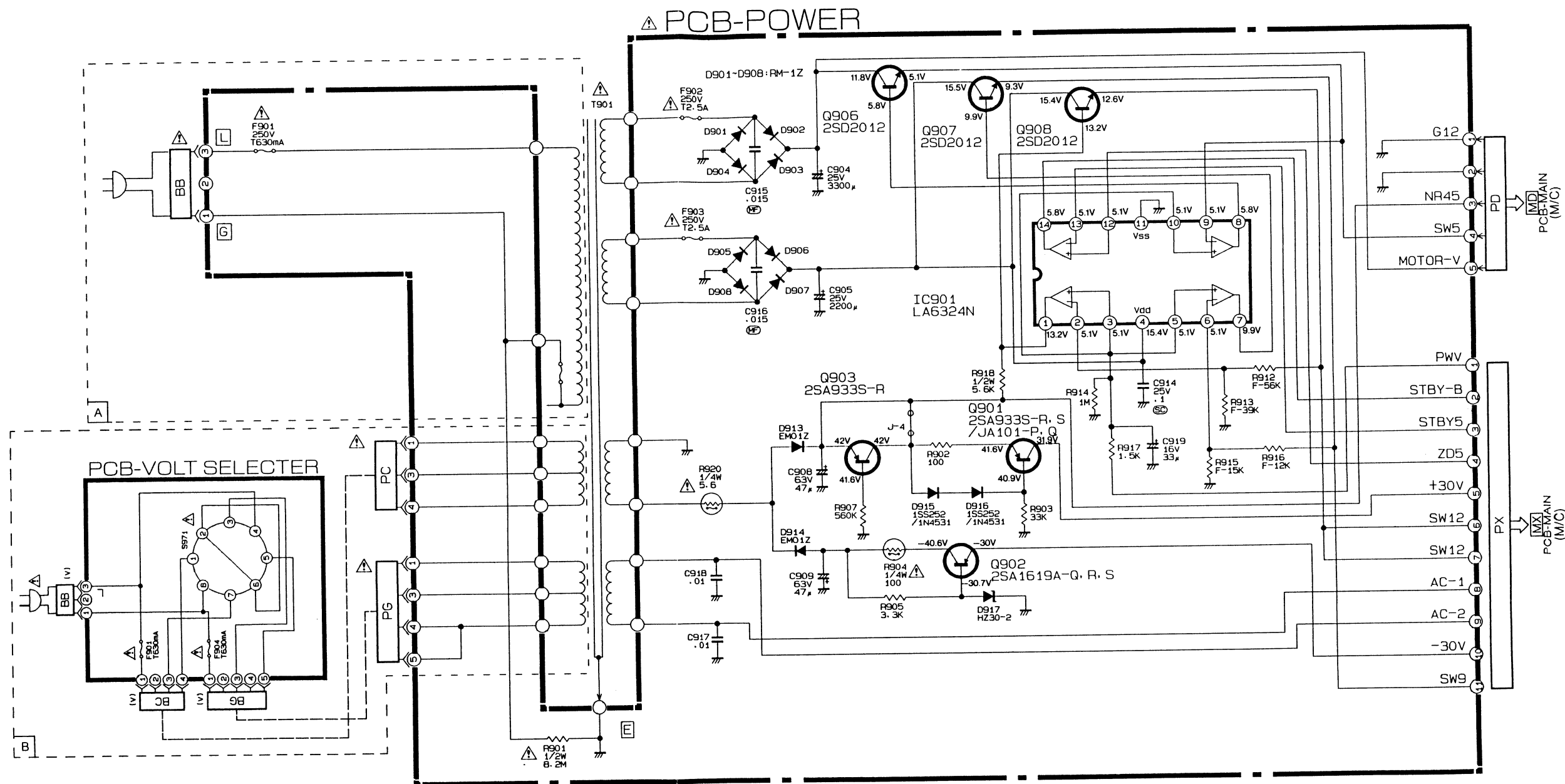
6

7

8

VBA0 9-MT-105GK





(POWER)

○ : Employed × : Not employed

MODELS	SYMBOL NO.	A AREA	B AREA	J-4	Q903	Q907
HS-M34(E)/(Y)/(IR)		○	×	○	×	×
HS-M34(B)		○	×	×	○	○
HS-M34(NZ)/(EE)		○	×	○	×	×
HS-M34(P)/(HD)		×	○	○	×	×
HS-M33(A)/(Y)		○	×	○	×	×

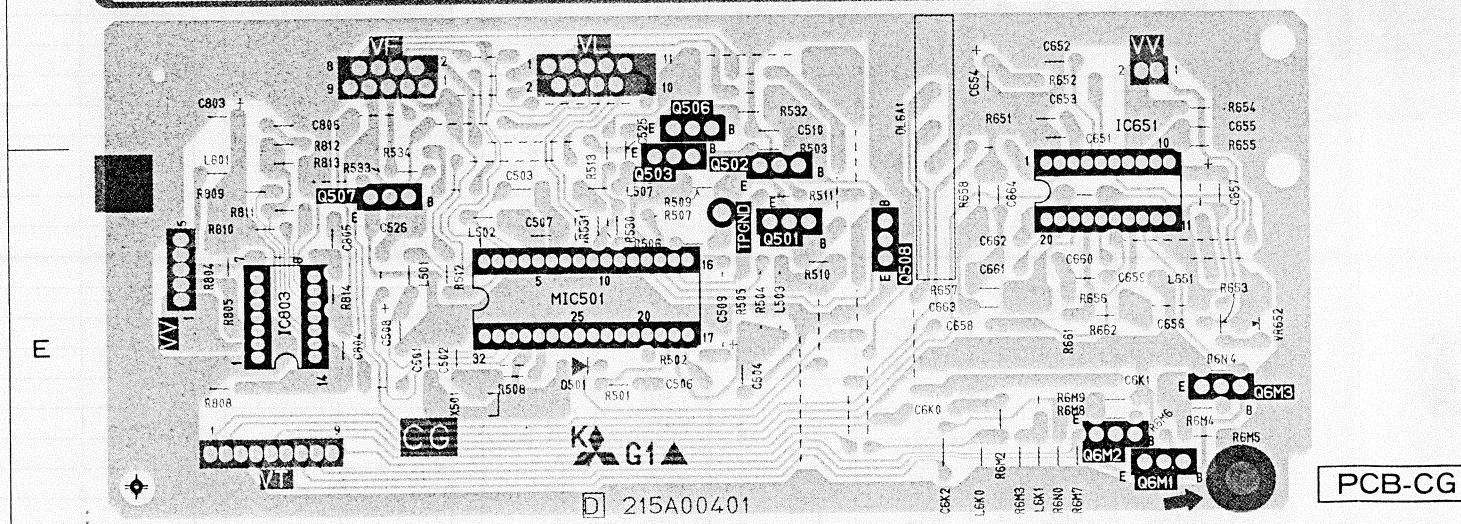
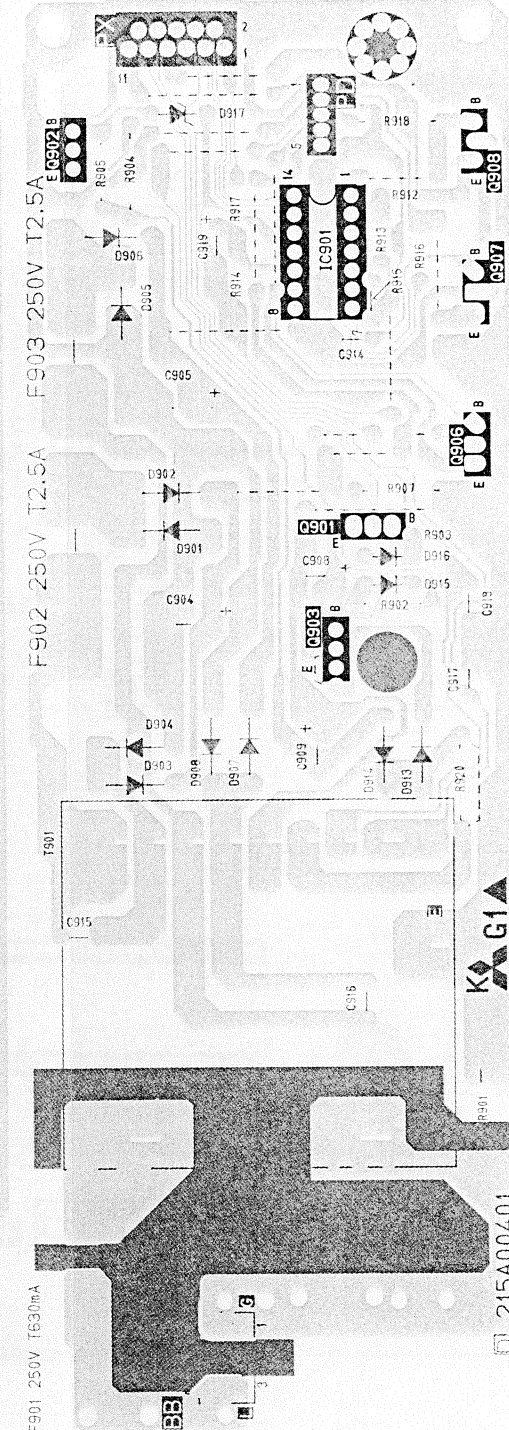


SERVICING PRECAUTION

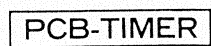
SYMBOLS INDICATE COMPONENTS HAVING SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY AND PERFORMANCE. THEREFOR REPLACEMENT OF ANY SAFETY PARTS SHOULD BE IDENTICAL IN VALUE AND CHARACTERISTICS.

DON'T DEGRADE THE SAFETY OF THE VCR THROUGH IMPROPER SERVICING.

PCB-POWER



SYMBOL NO.	ADDRESS
BPF6A0	B-3
BPF6A1	A-3
CF101	A-1
CF151	B-2
CF152	B-2
CF5A0	C-5
CU01	A-1
D2A2	C-2
D2A3	B-2
D2A4	C-1
D2A5	C-1
D2A6	A-4
D2A7	C-1
D2M0	A-4
D2M1	B-4
D2Y1	B-5
D2Y2	B-5
D4A1	C-4
D4A6	C-3
D501	E-2
D5A0	C-5
D5A3	D-1
D5A4	D-1
D5A5	D-5
D5A6	C-5
D5B9	D-1
D5C0	C-5
D5C1	C-4
D5C9	D-2
D5D2	C-5
D6A0	A-3
D901	B-6
D902	B-6
D903	C-6
D904	C-6
D905	B-6
D906	A-6
D907	C-6
D908	C-6
D913	C-7
D914	C-7
D915	B-7
D916	B-7
D917	A-6
DL6A0	B-3
DL6A1	D-3
F901	D-6
IC101	B-2
IC102	A-1
IC2A0	B-5
IC2A1	B-1
IC2H0	A-4
IC310	C-2
IC311	D-1



HS-M33(A)/(Y)
HS-M34(B)/(E)/(EE)/(HD)
HS-M34(IR)/(NZ)/(P)/(Y) (5/5)